FOOD MANUFACTURE

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World Food Prospects

BY THE time this is published, presumably more will be known of the harvest prospects for 1946. It does not seem likely, on present showing, that the total European harvest will be much more than 30 per cent. above that for 1945. That would still leave a serious deficit in the European zone (possibly one of 12 to 15 million tons), particularly as the harvest will certainly not be even from country to country. Although there is much land still poorly cultivated in Western Poland, the prospects there and in the western parts of Czechoslovakia are said to be fair. Greece appears to have increased production very markedly, but at the best is bound to be a deficit country.

Meanwhile, it seems clear that the carry-over stock in the overseas exporting countries will be very low. The world will, as was pointed out at the conferences both of the FAO in Washington and of the farming associations in London, undoubtedly be living on its current income to a large extent. This places the emphasis in the coming crop year upon efficient organisation. Since there will be a small margin of grain for accidents and unpredictable chances, the available grain must be husbanded and distributed with the greatest care. The replacement of the Combined Food Board by some kind of Supreme Planning Council is to be welcomed; but we might as well face the prospect realistically.

During the war (and while the countries concerned were compelled by war to pool their resources) the Combined Food Board was a useful statistical machine. Its business was to allocate ahead the *probable* amount of food passing through the pipe-line at any period up to a few months in advance; and this amount had to be allocated among the various recipients, including the large allied forces, in different parts of the world. When the war ended, the Board could still continue to allocate ahead, but it by no means followed that the countries concerned would observe its recommendations. They were under less compulsion to do so. While, then, the Board remains an efficient statistical machine, the ultimate question is how far the large producing countries are prepared to follow the advice of their statisticians.

The emergence of a kind of supreme economic council simply means that if the countries see the need of making it work they will give evidence of their intention by sending as their representatives men who can pledge the action of their own governments. That is the most we can hope. But it will be impossible to realise any dream of even distribution throughout the world—the political divisions are too great and the arguing counters used between one country and another are too dissimilar. Thus, while it has been agreed that the Japanese shall not receive any preferential treatment, the possibility of internal disturbances has been envisaged and "that the low level of feeding contemplated may not suffice to provide the minimum essential for the safety of the occupation forces." In other words, occupying countries that control any portion of the world's available food stocks are obviously going to use them with advantage if the peoples they govern grow restive. Both the Americans and the Russians (to a lesser extent) are in a position to utilise food supplies for this purpose. The Russians have certainly shifted more than a million tons at intervals over the last year or so into Eastern Europe and the Balkans. The trouble is that contradictory statements are made regarding stocks available in different countries, the statements varying with the bias of the informant. For example, the Dutch authorities have inclined to take a gloomy view of Indonesian food prospects, whereas the Indonesians themselves assert that, as far as rice is concerned, they are comfortably placed, though with no very large margin for safety. In this case the Indonesian statement may be accepted, since there is no

reason to believe that the native rice cultivators have been seriously disturbed, even if the production of industrial crops was affected by Japanese occupation.

In sum, it is evident that countries who have a surplus to dispose of will use it, not necessarily as a bargaining weapon, but at least to make their own spheres of occupation or control reasonably secure from unrest. One could scarcely expect them to do otherwise. Britain, who has no disposable surplus, but who is rather herself a claimant, must take such interpretation of agreements as the large producing countries care to put upon them. It is disconcerting; but when tons of wheat are the bargaining counters we must necessarily make a poor hand at the game.

Empire Scientific Conference

The Royal Society's Empire Scientific Conference, opened on June 17 by H.M. the King, will be in session until July 8.

The necessity for the continued interchange and mobility of Commonwealth scientists in order to maintain the pre-eminent position of British science was the subject of the session held on June 20, and it was urged that more frequent short visits by leading men of science and specialists from the Dominions should be made. Of paramount importance, however, was the need for providing research grants to enable recently graduated students, as well as more senior scientists, to obtain experience in universities and scientific institutions overseas.

The Conference decided to give detailed consideration to the need for finance, for the improved interchange of scientists, for the necessary increase in scientific staff, for the use of Scientific Liaison Offices for administering schemes for travel, and means of providing information about scientific work in different parts of the Empire.

Pasteurisation by Ultra-Violet Rays

A plant that is claimed to pasteurise milk at room temperature by means of ultra-violet light has been examined by British investigators at the Hansa Meierei, Lübeck, Germany.

Attempts made in other countries to achieve pasteurisation by this means have failed, mainly because of the low penetrability of the ultra-violet light into the milk. In America ultra-violet light has been used for several years to make glassware and crockery bacteriologically clean. It seems that in the German plant the low penetrability of the rays is overcome by the length of tubing through which the milk is passed.

An official report on the Lübeck investigation states that an experimental plant designed for the vitamin D enrichment of milk by ultra-violet rays was seen in operation, and German scientists claimed that the plant also pasteurised the milk.

On the basis of the pasteurisation claim, a commercial plant is being installed at Lübeck by a Hamburg firm and should be in working order in October next. It consists of three units each capable of processing 100 gallons an hour. Each unit consists of fifty straight quartz tubes 2 metres long placed vertically and joined together in series with polyvinyl plastic tubing. The three units will be housed in a single metal cabinet 10 ft. high with a base 4 ft. × 5 ft. The cabinet will be flooded with ultra-violet light from tubes running the height of the cabinet and situated between the rows of milk tubes.

Milk processed in the experimental plant revealed a slight difference in taste compared with untreated milk. A rise in temperature of about 9° F. occurs in the milk during its passage through the plant. Discussions with Professor Möhr at Kiel suggested that there are different regions in the ultra-violet spectrum that favour the increase in vitamin D, production of toxins, and the destruction of bacteria respectively.

Substitute for Egg White

Another process investigated in Germany is the manufacture of a substitute for egg white from skim milk and flour.

The skim milk is first condensed to a total solids content of 25 per cent. Wheat is then added until the wheat solids amount to 30 per cent. of the total solids. The mixture is then dried by the ordinary roller process. Flavouring is added as required.

British investigators tasted the product, and when made into a whip they considered it a good substitute. In making a whip, four parts of cold water are added to one part of the product and whipped for twenty minutes. The physical condition of the whip appeared to be more stable than similar whips made from white of egg, though its flavour could not be considered as identical. The report states that the product should be of interest to bakers and confectioners.

The investigators were informed at Weihenstephan that an egg white substitute had been produced from precipitated milk protein and apple pectin. No sample was available for examination, but it was claimed that on reconstitution the product was an excellent substitute for egg white and was very palatable.

Proposed Locker Plant System

An indication has been given that trade interests in Glasgow are considering the establishment in the city of a locker plant system to operate as in the U.S.A. with accommodation available to the public for storing under refrigerated conditions.

No details are yet available regarding the development, which is still in its initial stages and which depends on the availability of supplies and freedom from control.

It is also understood that considerable progress has been made in both Edinburgh and Glasgow in the development of quick freeze plants to service the trade and the public on a commission basis. Here again there is no hope of such plants operating until the supply position has been materially improved, but there are indications that owners are planning ahead to ensure that they are in a position to operate as and when food supplies return to normal.

Camouflaged Milk for Schools

In order to counteract the disinclination of a significant proportion of children to take due advantage of the Milk-in-Schools Scheme, the Fife Education Authority are collaborating in a Ministry of Food experiment confined to four areas in Britain to determine the degree of acceptance of milk presented in a more attractive form. The present experiment involves the use of flavoured powdered milk blocks. Eighteen schools in Fife will be used to test the reaction of Scottish children to this scheme. There are to be nine flavours and three different types of blocks, each block containing the equivalent of one-third of a pint of milk—the same quantity as would be taken under the Schools Scheme. The blocks would be eaten like biscuits.

Nationalisation of Transport

An extensive variety of subjects was covered at the annual Trade Conference of the National Chamber of Trade which opened at Scarborough on May 20.

In his Presidential Address, the Rt. Hon. Sir Walter Womersley, Bart., described the attitude of the N.C.T. as a trade organisation dealing with trade problems irrespective of political opinions, and confronting them according to the economic facts as they exist and not by the dispute of contending political ideologies. Speaking of rationalisation and nationalisation, the President said that the distributive trades had no wish to undergo the process of rationalisation which held the field a few years ago and which would have the effect of concentrating distribution into fewer and larger units which would redound to public disadvantage without any compensating benefit.

With regard to nationalisation, he said that it would not be the big financial interests which would be most affected by the Government's schemes, but the "little man" and his nest egg.

Dealing with a charge of inefficiency that had been repeatedly levelled by economists and statisticians against methods of distribution because they did not conform to their tidy plans and theoretical musings, Sir Walter said that such efficiency was not determined according to the size of a unit, but was capable of achievement by all units whether they were large or small. It had been stated by the President of the Board of Trade that before the war far too large a proportion of labour had been used in distribution, and that beyond the reasonable minimum requirements of distribution, the rest of our labour should go into production. It was frequently overlooked that the distributive trades were responsible for the distribution of the total of the country's produce for home consumption, and he maintained that it was part of the complete economic process of production of goods for consumption, and the demand on the part of the consuming public for adequate and efficient distributive services was the reason for distribution becoming such a large and important industry. If Ministers persisted in attempts to reduce the labour force in distribution, there was every prospect that the bugbear of queues would become a permanent feature of life.

Lord Long, in the course of his speech to the Conference, commenting on the proposed nationalisation of road transport, said that it did not start with vast sums of money, with Government help or subsidy, or through large monopolies and combines. It started at the end of the first world war, when men bought a vehicle, drove and serviced it themselves, and so built up, through their own initiative, the industry as it existed today. There were two contrary opinions as to the industry's record. Mr. Herbert Morrison, when in Canada, had said that road transport must be nationalised because it was inefficient; but Mr. Barnes, Minister of Transport, had said that it was a most efficient industry, but that it would be nationalised all the same. It had been said that nationalisation would bring the workers in the industry better conditions and better wages, but it had its own tribunal which, since 1933, had worked with perfect harmony. The conditions

could not be so bad seeing that road transport was the only industry that had not had a strike throughout the whole war period.

It was generally understood that road transport had been more or less nationalised since 1943, but, in fact, only 11 per cent. of the industry had come under the control of the Minister of Transport, with the result that driver after driver had testified that the moment he came under this Government scheme up went all his expenses; up went his cost of living, because he could not get home; and he was sent here, there, and everywhere with tremendous waste of time, labour, and money. In Northern Ireland, since road transport had been nationalised, a debt of more than £600,000 had piled up, and freight charges had gone up by 250 per cent. Lord Long could not help thinking of another election—that which took place in Germany in 1933—where the policy presented was the nationalisation of main industries and banks, great cuts in interest on capital, and promises of no unemployment. It cost us a frightful price to defeat all the evils which sprang from that election.

Continuation of Some War-Time Statutes

The Emergency Laws (Transitional Provisions) Act, 1946 extends to December 31, 1947 the various war-time Acts and Regulations which were time-limited to expire in post-war times, one being the Restoration of Pre-War Trade Practices Act, 1942, which requires an employer to restore any trade practice in operation before September 3, 1939, which has been departed from since, within two months of the end of the war period, such end to be considered by this new Act as December 31, 1947. The position, therefore, is that any trade practice followed during the war can be continued without breaking the law of this Act.

The Patents and Designs Act, 1942, gives power to the Government to sell any goods, whereas previously, by the main Acts, this selling power was restricted to articles no longer required for the service of the State; this power, now continued, allows the purchasing and importing by Government Departments of particular articles and goods (*e.g.* foodstuffs by the Ministry of Food, etc.). Certain Defence Regulations are to be continued; these relate to patents, trade marks, etc., mostly concerning permits and discretionary powers of the Comptroller as regards departures from ordinary rules and provisions, and time limits for doing certain things.

Various other Defence Regulations are continued, one relating to shops closing (*i.e.* shorter permitted hours than under the chief Acts) and an important one allowing the Board of Trade, if so desired by any industry, to make provision for requiring members of that industry to subscribe to the cost of research and experiment, collection and publication of statistics, and so forth.

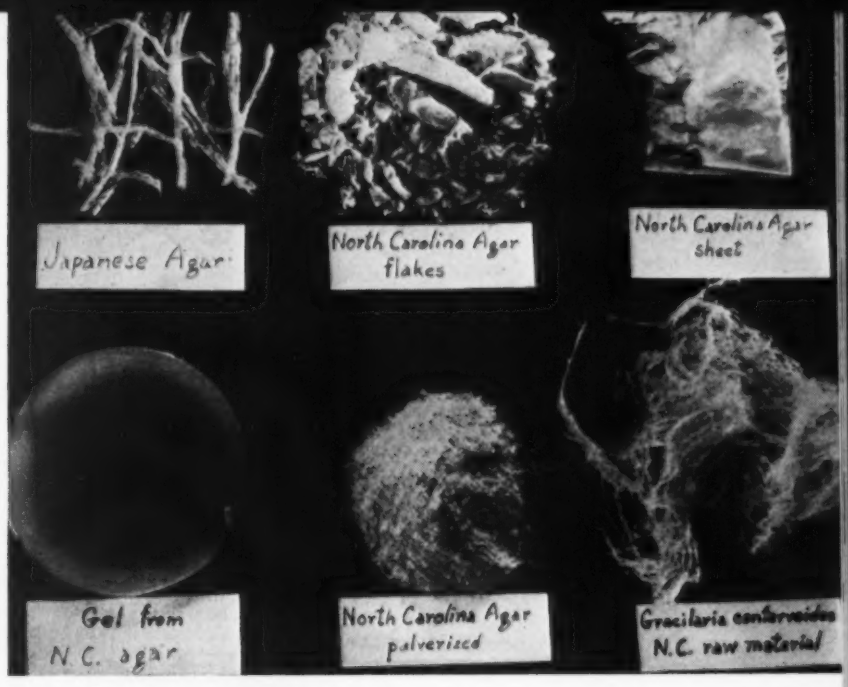
As regards the foregoing, however, although the above enactments are continued until December 31, 1947, any section of this Act under review can be ended earlier by Orders in Council.

Some war-time provisions have become permanent law by this Act, one to be noted being from the Road and Rail Traffic Act, 1933, which originally (*a*) required the keeping of records *re* transport matters (*i.e.* drivers' work hours, rest intervals, journeys done, goods carried, etc.) for six months plus (*b*) an extra period of six months (or less) if required by the licensing authority; this is now to be three months under (*a*), while (*b*) remains as before.

Beet Sugar

The centenary of the remarkable escape of Napoleon III from the fortress of Ham, when Louis donned a workman's clothes, put a ladder over his shoulder, and brazenly walked out in broad daylight, recalls his close interests in beet sugar while in that prison. As if to uphold the championing of science (and particularly beet sugar) by the more famous Napoleon I, the royal prisoner not only took up chemistry in a converted laboratory at Ham but composed his *Analyse de la Question des Sucres*, distributed 3,000 copies of this work among members of the government and others, and championed the cause of sugar manufacturers as counterblast to those perfidious English, who had (so he said) tried to bribe Achard to condemn beet sugar as inedible, and had compelled Humphry Davy to add his condemnation too.

Such a championing by the Napoleons because of a British blockade is but a further facet to the bright tale of beet sugar. Martin Klaproth, German chemist, began it; Achard of Kunern continued when his master Klaproth was too busy with other chemistry; and Frederick William III of Prussia gave it his blessing. Germany raced ahead, for Achard had been born outside France as a result of religious persecution. Yet Napoleon's 70,000 acres of beet had its effect later, when forty small factories sprang up in France to prove that royal patronage makes its mark.



Samples of agar, including raw material and the finished product in three forms ready for market as sheet, as flakes, and as powder.

Agar Production

The production of agar was greatly stimulated during the war years by the lack of supplies from Japan which accounted for 90 per cent. of the entire world's needs. Much research has been done in the U.S.A., Australia,* New Zealand, and Britain, in places where the requisite species of seaweed are found.

BEFORE the war the manufacture and supply of agar was practically a Japanese monopoly. The scarcity of this product stimulated production in regions where the necessary seaweeds were found, mainly in the South Atlantic and East Gulf Coasts of the United States and also in Australia and New Zealand. As a result of investigations by Dr. Harold J. Humm of the Duke University Marine Laboratory, North Carolina, U.S.A., one of the leading American authorities on seaweeds, agar production on a large scale has been carried out since 1943 due to the discovery of the red seaweed *Gracilaria confervoides* along the North Carolina coast, and this has been harvested, dried, and sold by fishermen to processing factories.

In the Beaufort region of North Carolina, *Gracilaria confervoides* grows in great loose masses in shallow water. It is collected by forking it into small boats. The agar made from *Gracilaria confervoides*, though not identical with that from *Gelidium*, the genus used for this purpose in California and Japan, is sufficiently similar to be referred to as agar and appears to have somewhat greater gelling strength and greater elasticity than *Gelidium* agar.

Dr. Humm, writing in *Science*, 100, 2593, 209-212, states that *Gracilaria* agar is more variable in temperature of gelation and usually somewhat higher than *Gelidium* agar, the causes for which are not yet fully understood. The yields in terms of percentage of dry weight of weed vary from 25 to 45 per cent.

Gracilaria multipartita (Clemente) J. Agardh, common on shells and jetties along the North Carolina coast, though not of commercial abundance, produces agar of a quality and yield similar to that from *Gracilaria confervoides*.

The Manufacturing Process

The seaweed is dried by spreading it on racks covered with wire, slats, or netting, although in some cases the weed is sent direct to the plant for drying there. It is then washed and soaked for twelve to fourteen hours, after which the material is transferred to digesters and heated by steam under pressure, several extractions being made before the spent weed is discarded as waste. The

* An article on Australian agar production was published in FOOD MANUFACTURE, March, 1943, page 85.

Main plant of the Van Sant operation in Beaufort, N.C., where American chemists are overcoming a former Japanese monopoly in agar.

Seaweed being forked into a small boat by this autumn harvester near Beaufort, N.C., U.S.A. Once despised as a net-fouling nuisance, Gracilaria confervoides is the basis for a new industry on the Carolina coast.

The first step in the elaboration of seaweed into agar is drying. The gatherers are spreading the weed on to outdoor racks. Sometimes the seaweed is delivered wet to the processing plant and is dried there.

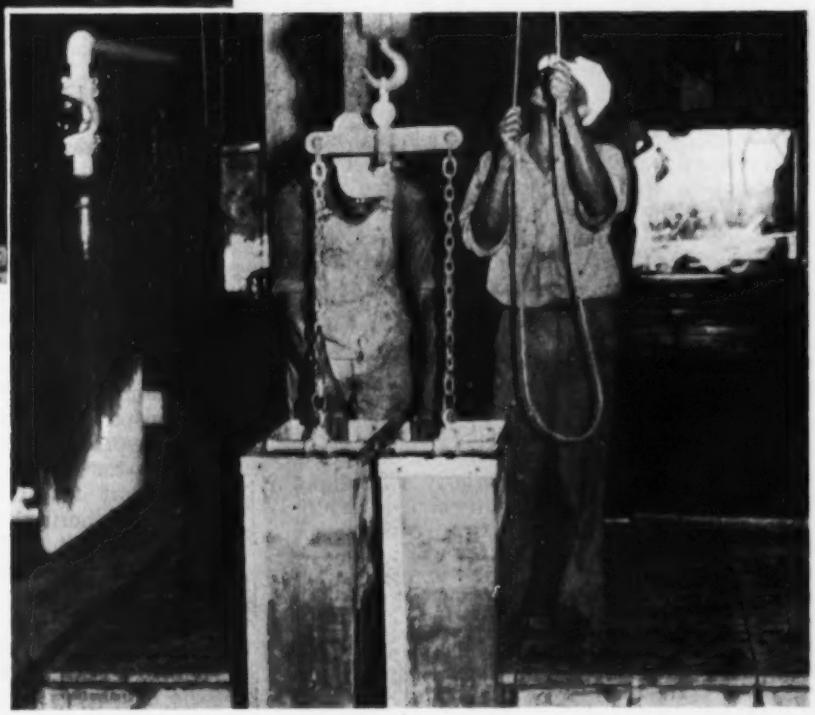
Above: Agar-bearing seaweed starts on its way into the plant for processing.

solution of agar is then clarified and filtered and poured into tanks, where it solidifies firmly in about twenty-four hours at room temperature. The gel is then chopped and frozen in ice cans. The next stage is to thaw the frozen gel at about 50° F., after which it is separated from the liberated water. The agar flakes are then fed into tunner driers and drying is carried out from 45° to 50° C.

British Seaweeds

In the British Isles the two most promising sources are *Gigartina stellata* and *Chondrus crispus*, commonly known as Carrageen or Irish Moss, found on certain parts of the west coasts of Ireland and Scotland. Simple extraction of the British seaweeds does not yield a gel-forming agar, and much patient research was carried out at the Marine Biological Research Station, Millport, before a satisfactory method of preparation was established. Difficulties were also encountered when it was attempted to apply the Japanese method to large-scale production, but these were finally overcome and agar similar in most respects to the Japanese product was obtained.

The gels formed by the British agar are similar in consistency to those of the Japanese product, but have the advantage of being more transparent. The method of preparation results in a high mineral content in the final agar (25 to 30 per cent.), but this has proved to be no disadvantage in experi-



Right: The stiff jelly is frozen to effect the separation of the pure agar (seaweed gelatine) from its water.

Dr. Humm inspects a sheet of agar made in the laboratory from Gracilaria confervoides. In this form it is as thin and transparent as Cellophane and might be used as sausage casing—one of the many commercial uses of agar.

ments with a wide range of bacteriological media. The mineral fraction is a fundamental part of the gel complex and is not to be considered an impurity as in the case of Japanese agar.

The chemical composition of agar is not known with certainty. It is a complex polysaccharide said to consist of a chain of galactose units united to a sulphate residue.*

Uses

Agar is the basis of most bacteriological culture media and hence is of great importance. The agar plate method for assaying solutions of penicillin has increased the demand, and large quantities are used in the routine bacteriological examinations. No other solidifying agent has proved so satisfactory.

* For further information on the chemical constitution of agar see: Haas and Russell-Wells, *Biochemical Journal* (1929), **23,** p. 425. Jones and Peat, *J. Chemical Society* (1942), p. 225. Barry and Dillon, *Chem. and Industry* (1944), **63,** p. 167. Percival and Thomson, *J. Chem. Soc.* (1942), p. 750.

From the bacteriological aspect the physical characters are important and a satisfactory agar should conform with the following requirements:

(*a*) It should dissolve in hot water, forming an almost colourless clear solution, which on cooling sets to give a firm gel.

(*b*) The surface of the gel must be sufficiently hard so that inoculation, using a platinum loop, will not tear the gel.

(*c*) The gel must remain solid at a temperature well above the normal incubation temperature (37° C.), but once melted must remain liquid down to 35° to 40° C.

(*d*) The agar must not contain any inhibiting factor which will affect the growth of micro-organisms.

In addition to bacteriological requirements, there is a large and increasing demand for agar for industrial purposes. Large quantities are used in the food industry for meat canning, as a stabilising and thickening agent for soups, sauces, and creams, and in the preparation of sweets and jellies. In pharmacy, agar is useful as an emulsifying and stabilising agent. Other commercial applications are in the textile, cosmetic, and paint industries.

NOTE.—We are indebted to Mr. B. A. Forder, B.Sc., Ph.C., M.P.S., for details of British seaweed research furnished by permission of the director and staff of the Marine Research Station, Millport, and the directors of Paines and Byrne, Ltd.

Mineral Deficiencies in Crops

AN article in the latest annual report of the East Malling Research Station, Kent, in addition to describing how methods of plant analysis and plant injection have been developed to diagnose mineral deficiencies in fruit trees and other plants, gives two striking examples wherein lack of calcium affected the yield of potatoes and the quality of pasture. Leaf analyses of samples of medium and poor potato crops from seven localities showed all the poor plants to be more deficient in calcium than the medium. The Committee consider that the calcareous dressings in 1943 were largely instrumental in producing an extra 3,000 tons of ware and seed potatoes.

The report indicates an exhaustive programme of research in horticultural matters, and the general review of research work includes Pomology, Statistics and Records, Plant Physiology, Pathology, Protective Chemistry, Biochemistry, Entomology, and Hops.

A special section is devoted to bulletins for fruit growers and another to detailed research reports.

Wheaten Flour

Its Characteristics and Uses

A. J. AMOS, Ph.D., B.Sc., F.R.I.C.

After giving a brief review of the chief characteristics of a good bread-making flour, the author discusses those possessed by flour for other food purposes, especially "M" flour, the abstraction of germ from which has been the subject of recent controversy.

IT is true that the bulk of our flour goes into bread, but wheaten flour is nevertheless used for a variety of purposes other than bread-making and, before the war, found an even more extended use. The manufacture of self-raising flour and biscuits and the production of other baked goods, such as cakes, crumpets, and wafers, immediately comes to mind, but flour is, or has been, used also—to quote a few examples—in the production of liquorice goods, in fish-frying establishments, and for such non-food purposes as the manufacture of textiles and of electric batteries. The types of flour required for many of these purposes need to possess analytical data, or to exhibit physical properties, different from those normally associated with flours intended for bread-making, and indeed for many of these uses ordinary bread flour would be unsuitable. Before the war it was not unusual, therefore, to find manufacturers of self-raising flour and manufacturers of biscuits who had adopted a specification for the flour which they used, but the official control of the milling industry which became necessary during the war rendered such a scheme inoperative. The Ministry of Food met the situation, however, by permitting flour intended for the production of foods other than bread to depart in certain respects from the requirements laid down for the standardised National flour from which bread had to be made. Since the bulk of the flour used in the production of foods other than bread is absorbed by the self-raising, the biscuit, and the confectionery trades, a description of the special characteristics exhibited by the flours supplied to these industries will be given. It may be helpful, however, if the chief characteristics of a good bread-making flour are first reviewed.

Bread Flour

The ability of a wheaten flour to furnish an elastic dough which can be inflated by gas generated within it so as to yield a light porous loaf is due to the fact that the two main proteins of flour—gliadin and glutenin—form in the presence of water a complex which has elastic properties. This complex, known as gluten, exists in the form of strands or fibrils throughout a dough and these constitute the skeleton or girder-work of the dough mass. The conversion of such a dough into a shapely well-aerated loaf requires two things: firstly, the production within the dough of an ample supply of gas, and, secondly, the attainment of such properties in the gluten network during the fermentation that the dough retains sufficient of that gas and moreover distends to a suitable extent under the pressure thus created.

The second of these factors—namely, the gas retention factor—is dependent in the first place upon the quantity and quality—*i.e.*, the physical properties—of the protein in the flour, but is also influenced by the extent to which the properties of this protein are modified, particularly in the direction of increased distensibility, during the fermentation. The gas production factor is related to the diastatic power of the flour—*i.e.*, to the ability of the flour to convert some of its starch into fermentable sugar. A good bread-making flour should therefore contain a reasonably high quantity of protein of good quality and should exhibit a reasonably high diastatic power.

Self-Raising Flour

Self-raising flour is flour in which has been incorporated sodium bicarbonate and sufficient of an acid ingredient to neutralise this. Today it is customary to employ about 3 lb. 4 oz. sodium bicarbonate per sack (280 lb.) of flour in order that the flour shall comply with the requirements of S.R. & O. 1946 No. 157 even after reasonably prolonged storage, together with a sufficiency of acid calcium phosphate or acid sodium pyrophosphate. When such a flour is made into a dough the added chemical ingredients commence to react to produce carbon dioxide, and this reaction is completed during the earlier stages of baking, with the result that the dough becomes inflated with gas and a light porous article is produced.

Whereas yeast-raised doughs are subjected to several hours' fermentation, self-raised goods are usually baked shortly after the dough has been made, and the time factor alone therefore precludes

the gluten of the latter undergoing any significant modification. Because of this and because of the smaller volume of carbon dioxide produced within the dough, the presence in self-raising flour of a high quantity of strong gluten will prevent the goods attaining a satisfactory volume. In other words, a good self-raising flour should contain significantly less protein than does a bread-making flour, and this protein should be weaker and hence more readily distensible than that of the latter. Before the war most good self-raising flours contained less than 10 per cent.—and many less than 9 per cent.—protein, and were made from grists which consisted largely of weak wheats, such as Australian or English.

Since the aeration of self-raised goods is independent of yeast fermentation, and hence independent of sugar supply, the diastatic activity of self-raising flour is, as far as conversion of starch to sugar is concerned, of no moment. It so happens, however, that a high starch-to-sugar converting power is often accompanied by a marked ability of the flour to convert starch to dextrins, and this is undesirable. A high dextrin-forming power may not prove detrimental to the quality of the baked goods which a self-raising flour yields, but it is liable to render the flour unsatisfactory for the production of boiled goods. It is obviously preferable, therefore, that a self-raising flour, unlike a bread flour, should exhibit a reasonably low diastatic activity.

It will be seen from the foregoing that certain of the features required in a self-raising flour are the very opposite of those demanded in a bread flour. Whereas in the bread flour the quantity of protein, the quality of the protein, and the diastatic activity need to reach a reasonably high level, they should in a self-raising flour be well below this standard and indeed at a level which may be unsatisfactory for bread-making.

Biscuit Flour

Good biscuit flours are even further removed from bread flours in analytical data and physical properties than are self-raising flours. In fact, a typical biscuit flour would be quite unsatisfactory for commercial bread production.

The protein content of a biscuit flour must be low, and a protein figure well below those of many self-raising flours is desirable. Many good biscuit flours contain no more than 8·5 per cent. protein, and samples with protein contents as low as 7·5 per cent. are occasionally encountered. It would seem that for biscuit work the natural protein content cannot be too low. During the war, of course, many of the flours produced for biscuit work contained well above 8·5 per cent. protein, and some of them approached a bread flour in protein content. It was not impossible to use such flours in biscuit work, but they often gave rise to difficulties in the manufacturing operations and tended to yield inferior goods.

Not only the quantity of protein in a biscuit flour, but also its quality is of importance. The protein must be weak—and considerably weaker than that of the average self-raising flour—but in addition it is desirable that it should exhibit certain definite physical properties. It is, for example, possible for two flours of equal and suitable weakness to differ appreciably in their suitabilities for biscuit work because their proteins differ in physical characteristics. The gluten of a good biscuit flour should not only be weak but should also be fairly distensible and not unduly stable or elastic. The best biscuit flours are those milled from all native wheat and particularly from those varieties which furnish a low quantity of distinctly weak and fairly distensible gluten.

The diastatic activity of a biscuit flour must be low; if it is unduly high the goods may take on too much colour during cooking. The diastatic activity of flour is usually expressed as the percentage of maltose present after the flour has been incubated with water for one hour at 27° C. and is referred to as the "maltose figure." Bread flours should show a maltose figure approaching 2 per cent. and would tend to prove unsatisfactory in the bakery if the figure were much below 1·5 per cent. Before the war, however, some biscuit manufacturers stipulated that the maltose figures of their flours should not be much above 1 per cent.

Confectionery Flours

The various goods made by the confectioner differ so widely in nature and composition that it is not to be expected that a single type of flour would suit all his requirements. For certain goods a flour not very different from a normal bread-making flour would be suitable, but a large proportion of the lines he produces calls for a weaker and less glutenous flour similar to that employed in the manufacture of self-raising flour. The confectioner's requirements with respect to gluten quantity and quality must, however, obviously vary according to whether he is making, for example, small fairy cakes, large fruited slab cake, or puff pastry. Thus, although the properties required in a flour intended for the production of a specific line of goods are known, it is not possible to lay down a general flour specification for confectionery work. Much of this work, however, does demand a special flour distinct from bread flour.

National Flour and "M" Flour

It will be apparent from the foregoing discussion that the manufacture of self-raising flour, biscuits, and confectionery depends upon the availability of flour which in analytical data and physical properties differs markedly from bread-making flour. The flour yielded by the grists standardised for National

bread-making flour by the Ministry of Food is too strong and glutenous for these purposes; it is, in fact, at times stronger and more glutenous than the bread-making flour of pre-war days. The Ministry therefore created another category of flour—designated "M" flour—for which they did not prescribe the wheat grist but which could be employed only in the manufacture of self-raising flour or as an ingredient in the manufacture of an article of food other than bread. This scheme enabled the miller who had obtained a licence to manufacture "M" flour to mill a grist composed largely or entirely of native wheat, and thus ensure that the resulting flour was suitable for the purposes for which "M" flour was designed.

The compulsory incorporation in flour of 7 oz. of *creta praeparata* per sack led to difficulties when "M" flour was used for the manufacture of self-raising flour. A self-raising flour which contained a proportion of bicarbonate sufficient to yield a total carbon dioxide content on the upper limit prescribed by S.R. & O. 1944 No. 44 would exceed the legal limit for carbon dioxide if it contained *creta*. The Ministry of Food therefore permitted the addition of *creta* to be dispensed with in the manufacture of "M" flour. This step could not be criticised on nutritional grounds as far as the "M" flour used for self-raising purposes was concerned, since the majority of self-raising flour contains a proportion of acid calcium phosphate which contributes to it about four and a half times as much calcium as would the statutory addition of *creta*.

"M" Flour and Germ

It has been explained so far that, although "M" flour has to conform to the level of extraction prescribed for National flour, it may differ from the latter in that it need not be made from the strong grist prescribed for National bread-making flour nor need it contain *creta*. It can, however, differ from National flour in one other respect. To quote the words of the Order, "M" flour need not "contain the maximum quantity of wheat germ which could have been included therein." In view of the misconceptions which have existed with respect to this ruling, and the wild and indeed ridiculous statements to which it has given rise, some consideration of the question will not be out of place.

Before the war wheat germ, which is one of the richest natural sources of the B vitamins and of vitamin E, was used in the preparation of various vitamin foods and vitamin concentrates. There was no difficulty in obtaining the germ since it was excluded from the white flour then being made, and all that was necessary was a design of mill flow which permitted the germ to be segregated from the wheatfeed. These special natural vitamin concentrates had proved their value in the field of nutrition and particularly in the nutrition of the ex-

(*Continued on page 296*)

Agriculture Chemists Visit Shinfield

SOME thirty members of the Agriculture Group of the Society of Chemical Industry spent a pleasant and instructive afternoon at the National Institute for Research in Dairying at Shinfield on Saturday, May 25. Prof. H. D. Kay welcomed the visitors and gave a general account of the work being carried out at the Institute, included in which were some details of experiments on the feeding to cows of iodinated protein. The use of iodinated protein arose from experiments on the feeding of thyroid and, subsequently, thyroxin. Iodinated protein increases the yield of milk from 20 to 30 per cent. Research is proceeding as to the ultimate effect of the substance on the cow itself.

A description of the work of the Dairy Husbandry Department was given by Mr. A. S. Foot. Active research had been carried out and was proceeding with a view to increasing the yields and protein content of kale for feeding purposes. Striking results have already been obtained by the use of sulphate of ammonia and field trials are being continued. Mr. Foot also briefly described cattle feeding with auxiliary substances such as urea, yeast, etc. Members were conducted through the farm buildings, where they inspected the cattle and pigs, after which Mr. Foot discussed silage.

In the Artificial Insemination Department, Mr. D. L. Stewart took the visitors round the pens in which twelve bulls were housed. Mr. Stewart gave an account of the scheme, its results, and potentialities as a means of improving the standard of dairy cattle.

An interval for tea followed, after which Dr. M. A. H. Tincker, chairman of the Group, in a short but felicitous speech thanked Dr. Kay and the members of his staff for having devoted their Saturday afternoon to the visitors. After Dr. Kay had replied, the members were conducted round the laboratories. Dr. G. W. Scott Blair gave a very entertaining account of current work and exhibited apparatus concerned with new rheological tests on cheese which were designed to replace judgments of quality by handling.

In the Nutritional Laboratory, Mr. S. Y. Thompson described chemical and biological work on milk. This consisted largely of vitamin assays. Mr. Thompson mentioned, in passing, some interesting work on rats with regard to their calcium requirements, which appeared to be highest at the early and late periods of life. He also referred to the appearance of vitamin B_1-synthesising micro-organisms in the intestines of rats which had been fed on a B_1-free diet.

Dr. A. T. R. Mattick described, among other things, some valuable work done by the Bacteriology Department on dried milk for the Forces during the war. In collaboration with other De-

partments large field experiments had been carried out on the effect of variations in the normal manufacturing process. The beneficial effects of greater care in details of plant managements, of use of a good milk supply, and of the adoption of a higher preheating temperature (190° F. instead of 160° F.) were shown by the progressive decrease in plate count and a marked increase (up to two years) in the keeping quality of the dried milk. Other interesting items touched upon by Dr. Mattick were strains of streptococci capable of inhibiting the growth of *B. tuberculosus*; also the effect of bacteriophages during cheese-making.

Finally, Dr. S. J. Folley gave a short talk on endocrine control of the mammary gland, and the party viewed the goats which, among other animals, were used for the purposes of these studies.

Although the different speakers had a very short time in which to present a picture of their work, and could only touch upon parts of it in the briefest terms, they made such good use of their time that members of the Group gained a clear idea of the nature of the important work being carried on by the Institute and the part it is playing in an attempt to solve the many problems that still lie before the dairying industry.

Testing New Empire Materials

THE perpetual problem of food for both animals and men is one of many subjects contained in the Annual Report, 1945, by the Director, Sir Harry Lindsay, K.C.I.E., C.B.E., to the Board of Governors of the Imperial Institute, London. For cattle-feeding purposes the artificial drying of grass has been developed considerably in recent years, and in order to get the best results accurate control of the process is necessary. To this end samples of the product from operations in Jamaica have been investigated for their nutritional value.

Of human food, cocoas from Zanzibar have been examined with a view to this commodity being produced as an alternative plantation crop in the island, which at present has no cocoa production. Agar-agar is now, as a result of war-time endeavour, being produced in Australia and New Zealand, and further samples from Australia examined recently were proved to be of excellent quality.

In Mauritius, where cassava roots have been largely grown as a war-time food measure, the question of turning the industry into an export trade has been considered, entailing the chemical examination of the prepared products. Cassava roots are the source of tapioca, of which the Dutch East Indies were large producers.

Papain, a digestive agent and a tenderiser of meat, obtained from the pawpaw fruit, chiefly a product of Ceylon and Tanganyika, has received attention in relation to steps to meet the expanding demand for this commodity.

Statistics showing the increases in sunflower cultivation, which have taken place in recent years owing to the world shortage of oils and fats, were furnished, and in this connexion it was stated that supplies of this commodity would find a ready market and the oil-cake would help to meet the feeding stuffs requirements of cattle.

Concentrating chiefly on the problems of producing rubber for tyres with enhanced advantages over synthetic substitutes, the Rubber Department has devoted more time to long-range investigations and in the development of a new method of preparing dry rubber from latex by a continuous process. The report states that when production in Malaya reaches equilibrium there will be a market for special types, among which softened rubber is of potential importance.

British Exports

WRITING in *The Mercantile Guardian* in January of this year, F. Lindley-Jones said: "Perhaps we should get out a book of rules for the new exporter. We might repeat the list of virtues which the old Merchant Adventurers displayed. There was Push which initiated markets; Perseverance which continued the contact; Personality which cemented it; Promptitude which endorsed it; Punctiliousness which set upon it the seal of service."

The answer to this is a monograph prepared by the Export Committee of the British Engineers' Association, which is divided into three parts.

The first stresses the necessity for Britain greatly to increase her exports if she is to survive as a world power and to maintain her standards of living. In this part an attempt is made to bring together the statistical facts about British exports and to describe the economic background of export policies. The effects of the war and of the American Agreement are examined and the material presented in a compact form.

Part II is addressed primarily to those engineering manufacturers who may not previously have had experience in export, and is concerned with the fundamentals of exporting technique. The point is emphasised that it is vital that any undertaking, large or small, should contribute its quota. Just as in war this country was saved by the small firms' output—considerable in the aggregate—as well as by that of the large firms, so now, in circumstances less dramatic but no less urgent, all must co-operate to the given end—more exports.

The third part consists of a statistical appendix containing seven tables, for the most part concerned with foreign trade for a number of past years.

Sides of beef from the cooling chambers in the process of allocation to depots.
Courtesy Ministry of Food.

Meat Plant Refrigeration

STARR PARKER, M.E.

Refrigeration requirements begin immediately upon the death of the animal. The old conception of "animal heat" which it was thought necessary to dissipate at normal cooling rates in a pre-cooling room has been fully discredited, and it is now accepted as best practice to chill carcass beef, hogs, veal, or lamb as rapidly as possible after the death of the animal. This article deals with operating considerations affecting the design of meat plant refrigeration, according to American practice.

INADEQUATE initial chilling to proper temperature is directly responsible for most bone-sour ham trouble as well as for much of the sausage spoilage. "Cool the meat fast and keep it cold" is an axiom of good operating procedures.

Various investigations have shown that the body temperature of the animal carcass increases sharply for a short time after death and may reach 106° F., hence the internal temperature of the ham or round will be very close to 103° F. when it arrives in the chill room.

Present-day meat plant schedules are such that it is necessary to chill the carcass within a sixteen-hour period, so that the hogs or cattle killed one day may be prepared for delivery or processing the following morning.

A uniform temperature of exactly 36° F. throughout the carcass is desirable for proper processing and ease of handling; a temperature of 34° F. makes the sides too stiff for cutting operations; a temperature of 40° F. increases the chance of spoilage. Actual chill room temperatures of 28° F. are most common throughout the chilling period, with a two- to four-hour tempering period allowed immediately prior to removal of the carcasses for cutting operations.

Heavy runs of livestock usually occur in the winter months, and an appreciable part of the production at this time is stored in freezers, to be brought out later as required. Meats will keep a very long time in excellent condition at temperatures below 15° F. if properly frozen and if drying-out is prevented. Meat is frozen as rapidly as possible in order to prevent rupture of muscle fibres due to large crystal growth. Freezing temperatures of −10° to −15° F. with holding temperature of +5° to +10° F. are commonly used.

Little attention is generally paid to proper thawing procedures, but best practice calls for initial conditions of 30° F., at 70 per cent. humidity, increasing gradually to 40° F. at 90 per cent.

humidity, with complete thawing accomplished in two to three days for, say, hog and beef sides.

Certain types of sausage, prepared to be eaten as fresh meat, but which have a cooked appearance, must be held in a freezer at −10° F. for ten to twenty days, depending upon the size of the pieces, in order that all *Trichinae* will be destroyed.

The majority of the tendered (both "Cook before Eating" and "Ready to Eat") type of smoked meat products are perishable and must be kept under refrigeration. Temperatures of 40° F. or below are required.

The design of meat plant refrigeration systems begins with the chill room.

Carcass Chilling

Carcass sides are suspended by the ham-strings from rods or hooks attached to overhead rail trolleys. Standard cooler design conditions are as follows:

	Rail Height.	*Rail Spacing.*	*Carcass Spacing.*
Beef cooler ...	11 ft.	36 in. min.	15-18 in.
Hog cooler ...	9 ,,	27 ,, ,,	10-12 ,,

	Hogs.	*Beef.*	*Veal.*	*Lamb.*
Specific heat above freezing	0·60	0·75	0·70	0·65
Specific heat below freezing	0·35	0·40	0·40	0·35
Latent heat of freezing ...	70·00	100·00	90·00	85·00
Carcass weight lb. ...	140-250	300-600	80-150	30-80

Room temperatures should be 28° F. or above with 95 per cent. humidity and air velocities as high as are practicable. Although many brine-spray unit installations are in operation at this time, blower units are coming into common usage for carcass chilling.

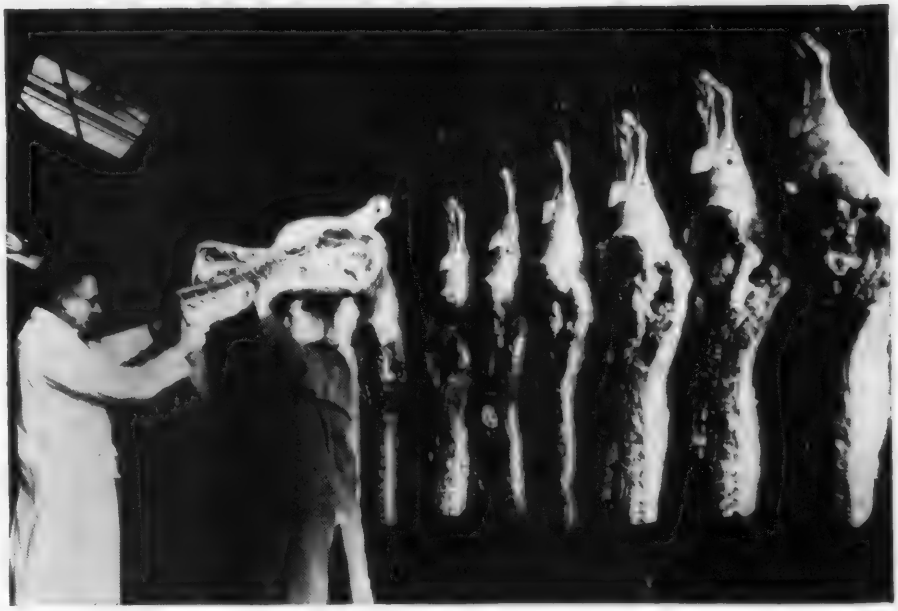
Probable future developments in this equipment will include automatic control of both wet- and dry-bulb temperatures, automatic defrosting, increased air velocities, positive control of air distribution.

Customary practice in beef aging coolers has called for 34° to 36° F. temperature with 75 to 85 per cent. humidity. Finished carcasses were carried under these conditions for four to six weeks. In recently developed methods of tenderising beef, the carcass temperature is cooled to 54° to 59° F., then transferred to a processing room where conditions of 68° F. dry-bulb and 88 per cent. humidity are maintained. A properly engineered installation of sterilising lamps prevents bacteria growth, while the higher temperatures used accelerate the action of the tenderising enzymes. Beef aged forty-eight hours at 68° F. by this method is equivalent in tenderness to beef aged six weeks at 34° F., with lower shrink and trimming loss.

Refrigerated Work Rooms

Although it is desirable to maintain a product temperature of 38° F. or below from the time the

Storage room in a Washington warehouse.



Allocation of hind-quarters of beef.
Courtesy Ministry of Food.

animal is killed until final processing, it has been found that temperatures below 50° F. reduce the efficiency of workers. Most cutting, trimming, sausage packing, bacon slicing, order filling, and similar departments are therefore carried at 50° F. and 75 per cent. humidity, with air velocity of 400 to 600 f.p.m.

Proper air movement is essential for the comfort of workers, and distribution systems must be as carefully designed as any air-conditioned public space.

Fresh Meat and Sausage

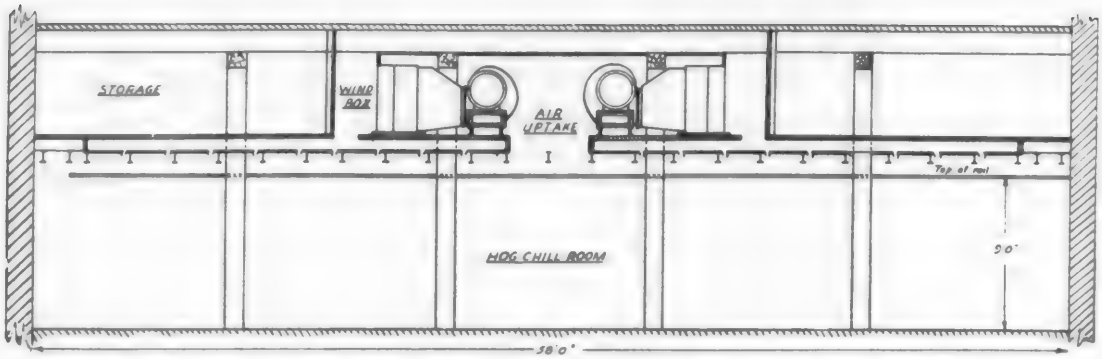
Fresh meat and fresh sausage should be stored at 28° to 36° F. (with pork at the lower temperature and beef at the higher) and 85 per cent. humidity with moderate air movement. It is important that the bright, fresh appearance of fresh pork be maintained, and this is accomplished best by keeping the surfaces dry, but not dried out, and at temperatures just above the freezing for meat.

Unloading lamb which has been "telescoped" to save shipping space.
Courtesy Ministry of Food.

Smoked Meat and Sausage

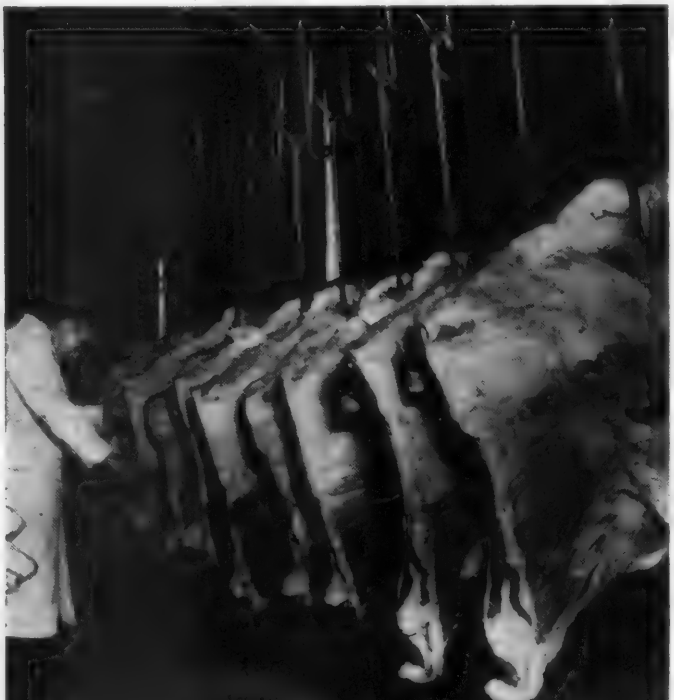
Smoked sausage is a perishable product and should be stored at temperatures of 38° F. or below with high humidity and low air velocities to prevent the product from shrivelling.

A 38° F. dry-bulb, however, bleaches the natural smoked colour from sausage very rapidly. Furthermore, condensation resulting from contact of the chilled product with outside air during the delivery period fosters the growth of mould on the product.



But in most plants serving local trade production is geared to demand so carefully that the sausage can be delivered to the butcher within twenty-four hours after being manufactured. Hence smoked and baked sausage is usually stored, in the packing-house, at 45° F., 85 per cent. humidity, and with low uniform air movement to prevent bleaching and shrink.

The colour of smoked meats is also impaired by low temperatures, and the growth of surface bacteria accelerated by condensation. Hence short-time storage of these products in the packing-house is usually accomplished at 50° F., 85 per cent. humidity, and low uniform air movement.



Assembly and Shipping Rooms

Conditions in assembly and order-filling departments must necessarily be a compromise. Low temperature is desirable for proper storage of all meat products, but the efficiency of scalers, packers, and other workers is lowered appreciably at temperatures below 50° F.

As a result, most assembly and packing rooms for mixed orders for local delivery are carried at 45° to 50° F., and the stocks of products in these rooms replenished at frequent intervals—say, every two to four hours.

Storage rooms for filled orders, however, may be dropped to 38° F., as most of the product is wrapped, packaged, or covered and will not be held in these rooms for periods long enough to do much more than cool down the shipping containers.

Test of Unit Cooler Operation

The room shown on the sectional lay-out is 52 ft. × 58 ft., and has a capacity of from 1,150 to 1,400 dressed carcasses. This space is equivalent to 26¾ cu. ft. space per hog, including aisle and head rail; units, wind box, and air duct space take up a total of 8½ cu. ft. per hog.

Fan installations consist of four twin blowers, driven by 3 h.p., double-end motors at 850 r.p.m. and having a capacity of 18,000 c.f.m. delivered air per unit (72,000 c.f.m total). The coils are made up of ⅝ in. c.d. copper-clad seamless tubing, with 0·012 in. fins spaced thirty-six per running foot and laid up twenty-four tubes high, eight tubes deep, in a six-header

(*Continued on page 299*)

Further allocation of forequarters of beef.
Courtesy Ministry of Food.

Tinplate Substitutes for Food Cans

II—RESEARCH IN GERMANY

SPECIALLY CONTRIBUTED

The first part of this article, dealing with tinplate substitutes in U.S.A., was published in the June issue of FOOD MANUFACTURE.

TIN was one of the metals with which the Germans had to economise with scrupulous care during the first world war, and still more so during the second; but it was not until about 1937 that experimental work was commenced on what proved to be one of the most effective substitutes—namely, phosphated (bonderised) sheet iron or blackplate. About that time one of the largest metal-working firms in Europe, the *Metallgesellschaft Akt.-Ges.* of Frankfort, already one of the principal pioneers of phosphating processes in Europe, was approached by other firms engaged in the manufacture of sheet metal with a view to the investigation of the use of phosphated blackplate instead of tinplate for food cans and other containers. The need became particularly urgent about 1940 and after, and research was intensified. Results of the most recent work in this field have been reported at length in *Stahl u. Eisen*, 1942, **62**, 685-694 and elsewhere, by Schuster, Krause, and others. Two of the companies collaborating were the *D.Z. Blechwarenvertriebs G.m.b.H.* of Leipzig and the *Blechwarenfabrik Fritz Züchner* of Seesen.

Change in Polarity

The authors discuss the special merits and demerits of tinplate in food canning, with particular reference to its change in polarity with respect to iron, according to the nature of the tinned foods—whether they are fairly neutral or non-aggressive, such as many vegetables, or acid and aggressive, as with most fruits. In the former case tinplate is more noble—in the electrochemical series—than iron, but in the latter it is strongly anodic compared with iron, thus itself passing into solution and protecting the underlying iron. This metallic couple action is of great importance as a factor in corrosive attack and has been dealt with at some length by Hoare and Hedges in their new book on *Tinplate* (Chap. XI), where also emphasis is laid on another factor—composition of the basic metal (iron), which appears to have been overlooked by the German writers. They note, among the defects of tinplate with certain classes of food, the black staining with sulphur-containing foods and other discolorations; also the metallic taste which sometimes seems unavoidable. These defects persist very often despite the utmost care with the finishing coats of lacquer or enamel.

The Metallges Phosphating Process

The phosphating process used by the Metallges was one of their many bonderising types, in which the coating consists essentially of tertiary zinc phosphate, together with a small percentage of secondary and tertiary iron phosphate. This is finely crystalline and dense and well anchored with, or diffused into, the basic iron. It is claimed, indeed, that the porosity of the coating is very low, so that some economy is possible with the subsequent finishing coat of lacquer. As is well known, the phosphating of iron or steel surfaces very considerably improves the adhesion of the subsequent coats of paint or varnish, but whether this better adhesion can be simply and entirely explained as due to the roughened surface resulting from phosphating, as the German authors suppose, is a debatable point which need not be further considered here, except to suggest that the explanation is evidently over-simplified and inadequate.

The thickness and crystal size of the bonder coating can be varied according to the grade of bonderising used. The B-1 grade gives a thin coating, 0·003 mm. thick, while the B-2 produces a thicker coating, up to 0·01 mm. Comparative tests with thin and thick coatings show that the former is better for the present purpose, with one lacquer coating, for it is not only more resistant to corrosion but withstands abrasion and deformation more effectively. The time required in both cases for phosphating was five minutes, as compared with the one minute claimed in the British patents, of which abridgments were given in Part I. In this latter case, of course, the plate was phosphated before being fabricated into containers, whereas in Germany the cans were made first and phosphated afterwards.

Pre-Treatment Before Lacquering

Special attention was paid to the effect of pre-treatment before lacquering, if any, under the four categories: (1) no previous treatment, (2) sand-blasting, (3) B-5 phosphating (thin), and (4) B-2 phosphating (thick); also to the type of lacquer used. The latter were specified as A, B, and C, and although fairly wide differences were found in their efficacy as finishing coats for the interiors of the cans, no details are given of their individual composition beyond the general statement that they

should be preferably of synthetic resin base. In testing their efficiency the electrical method of H. Niesen was adopted (*Farb. Zeit.*, 1940, 551-2, 569-70; French patent 705690), based on the A.C. flowing under a potential of 10 volts between the lacquered plate and an electrode. Lacquer B, whatever it was, appeared to be the best in most tests, including heating up to 120° C. in an autoclave to simulate actual conditions of use, the acidity test with lactic acid, and the saline test with the usual salt solution.

It is stated that the bonderised and lacquered blackplate cans were fairly extensively in use in Germany a year or two before the war, and were known under various trade names, such as Lemadose, Oftadose, Bonderdose, etc. (*Dose* = container). Welding the seams was introduced at an early stage in order to facilitate mass production, and special roller welding machines of high capacity were used as described in *Vierjahresplan*, 1940, **4**, 279-280. Welding was considered also more economical than soldering, in material as well as time, and resulted in a saving of at least 165 kilos of steel strip per 100,000 containers made owing to reduced overlap. The first bonderising and lacquering plant was designed and erected by the *Maschinenfab. Göhring u. Hebenstreit* of Radebeul, near Dresden, for the Züchner firm, and commenced operations in 1938. It was soon afterwards enlarged to an hourly capacity of some 5,000 to 6,000 containers.

Results of Tests

In the food canning tests carried out by an unnamed institute, several lots of different fruits and vegetables and other canned products were kept in store for a year or more at a temperature of 37° C. It is claimed that the containers proved satisfactory for meats and vegetables and for fish in oil, but with fruits the stability was not so good (*cf.* somewhat similar results obtained by Adam and Dickinson, *loc. cit.*). It is hoped to get better results with fruits with improved lacquers, and in 1942 Züchner was experimenting with welding the ends to the bodies in place of soldering, but with what success has not, so far as the author is aware, been reported. This point in regard to welding is not quite clear in the original, having regard to the mass-production methods above noted.

NOTE.—Bonderised blackplate has been extensively used in the U.S.A. in recent years. A standard American-type machine which handles bonderising of sheets is capable of dealing with 500,000 base boxes per annum. In an advertisement in *Iron Age*, December 12, 1942, the Bethlehem Steel Co. announced that their new bonderising units had been completed and thoroughly tested, and were producing "bonderised tin mill blackplate" in commercial quantities. Blackplate so treated gives much better lacquer and enamel adhesion, retarding underfilm corrosion. It is very well adapted for ends and bodies of general line cans and some types of sanitary can.

CORRESPONDENCE

"Refined" Foods

TO THE EDITOR OF FOOD MANUFACTURE

DEAR SIR,—By "refining" our foods over much, incidentally with great waste of ingenuity and labour, are we not needlessly injuring health? The familiar story of the wheat berry is now underlined by experience in the United States with domestic salt.

Shortly, it has been found in the United States that refining salt and taking out the iodine which Nature provided resulted in widespread ill health manifest in simple goitre. When, through the co-operation of public health authorities, doctors, the salt manufacturers and grocers, iodine was added to the salt and iodised salt was popularised, goitre was proportionately reduced.

Now the American Medical Association is recommending that a sufficient amount of iodine be added to all the domestic salt used in the United States. A similar recommendation for this country was made more than two years ago by the Medical Research Council Sub-Committee which studied the subject.

Iodine is already added to half the domestic salt consumed in the United States. In this country the proportion is negligible. Apparently nothing has been done about the Medical Research Council recommendation, although the health of hundreds of thousands of women and young people particularly continues to be needlessly impaired.

Yours faithfully,

A. LANCASTER SMITH.

Ascorbic Acid as a Canning Preservative

ASCORBIC acid is being used in Canada to protect canned and other fruits against oxidative spoilage. When, during the war, vitamin C-supplemented apple juice was substituted for citrus juice, it was found that the apple juice was lighter in colour and had a better flavour than untreated juice.

Vitamin C is at present being included in packs of frozen peaches, apples, and other fruits which are particularly susceptible to darkening. Vitamin C tablets are also being marketed for home canning.

The addition of this antioxidant vitamin to canned fruits, which normally lose the fresh fruit flavour and discolour quickly, may well be an important factor in the competition between canned and frozen foods.

An American pack for nuts, using Pliofilm in conjunction with paper or board.

Post-War Packaging

Having distinguished themselves "on active service," new packaging materials developed during the war will soon be available for general use. Tested under most stringent conditions, they have been proved highly adaptable for the purpose of food packaging.

AFTER being used to protect aeroplanes, precision instruments, and delicate equipment shipped to all parts of the world, flexible Pliofilm will in future be used to wrap foods, pharmaceuticals, and similar products for home and export service. Protection from contamination by atmospheric changes, insect infestation, and moisture vapour penetration is a natural characteristic of this material, and although it is derived from rubber (being rubber hydrochloride), which gives it special properties not found in the established cellulose films, Pliofilm is completely odourless and tasteless. Thus it can be employed for the direct wrapping of wet, dry, or processed foodstuffs such as fish, fresh meat, dehydrated foods, tea, coffee, cocoa, confectionery, and bread.

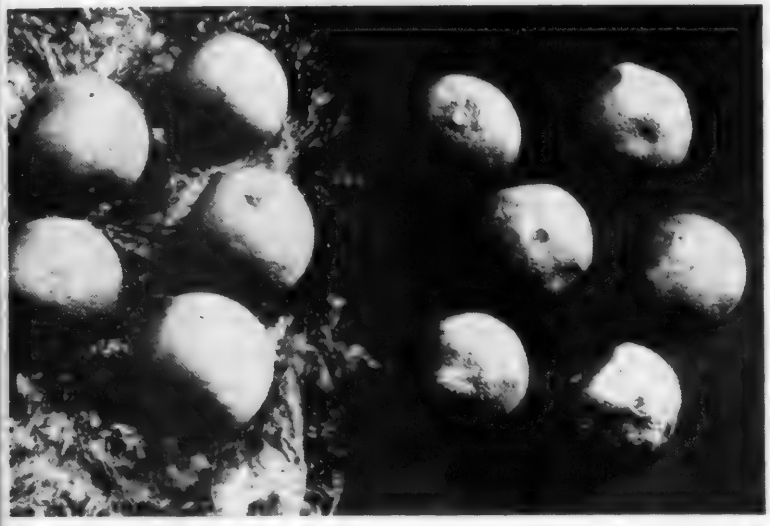
The ability to form a tight wrap round different shaped commodities and heat-seal the package has always been a feature of this rubber hydrochloride material, but recently a new technique known as "Stretch Wrapping" has been developed for fruit packaging and preserving, which will be extended to other food products in due course. This process is peculiar to Pliofilm and, as yet, is only in the experimental stage, but it has proved satisfactory so far (after more than twelve months' test) and will undoubtedly be adopted commercially for special purposes as soon as supplies of the material are available.

Stretch Wrapping

As demonstrated in the manufacturers' American laboratory, stretch wrapping is effected as follows: The operator spreads out a sheet of Pliofilm, lights a match, and circles the flame against the film on its underside for approximately ten seconds. The film does not burn, but it becomes thermoplastic, with the result that when the operator thrusts an apple upward into the section where heat has been applied it stretches and assumes the shape of the apple. The ends are twisted and the material cut off just below the apple, which is tightly sealed in its wrapper, the twisted film having welded itself together. Many products can be stretch wrapped in this way, and it is claimed that this process, plus the material's "breathing" properties, permits food (fresh or processed) to retain its field or factory freshness and flavour over very long periods. For example, in the case of fruit handled as above the Pliofilm wrapper allows CO_2 to escape but retains the moisture needed to keep the fruit fresh. Only one part of moisture filters through the film for every fifty parts of carbon dioxide that escape, with the result that even after six months' storage fruit packed in this way looks and tastes as if it had been recently picked. This "breathing" property of Pliofilm renders it especially valuable for packaging foods that emit gases which lead to their deterioration. Cheese is typical of such products,

and in America it is claimed that this characteristic of the material contributes effectively to the curing of 75-lb. cheeses, reducing their weight loss and preventing rind formation. The consumer package of cheese illustrated has a tensolised Pliofilm inner wrap, which is not sealed, and an ordinary printed outer wrap sealed at the ends. From this gases escape, and the cheese will remain in perfect condition for an indefinite period. Other products which emit CO_2 can be treated similarly, and there is no doubt that this material has a tremendous range of application in the food industry both for special purposes of this kind and ordinary foodstuffs which do not require to "breathe" but need preservation in packaging.

Hitherto Pliofilm has not been manufactured in Britain, but arrangements have been made for its production at Wolverhampton and supplies should be available soon.



Top left: Apples packed in Pliofilm by the new stretch wrapping process retain their orchard freshness and flavour for an indefinite period.

Centre: Typical American packs demonstrating the use of Pliofilm either as a direct wrapper or in conjunction with other wrappings.

Left: The oranges on the right have been kept at ordinary room temperature, while those on the left were stored in Pliofilm. Both groups were photographed after six months' storage.

American consumer unit of cheese packed in Pliofilm.

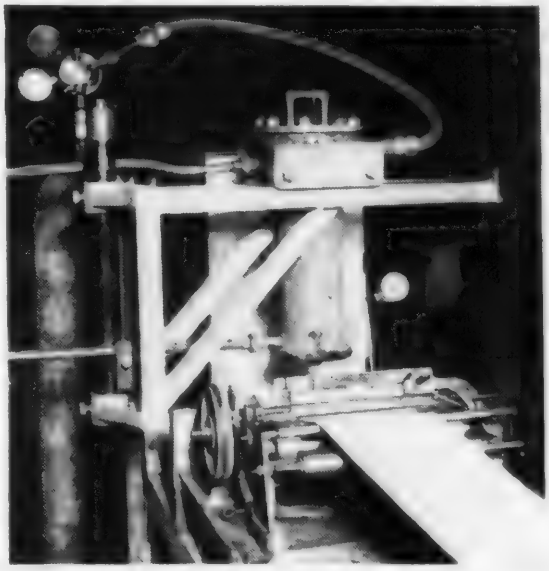
New British Plastic Film

Polythene, another new plastic film developed during the war, and used for packaging sensitive drugs, will also be available shortly.

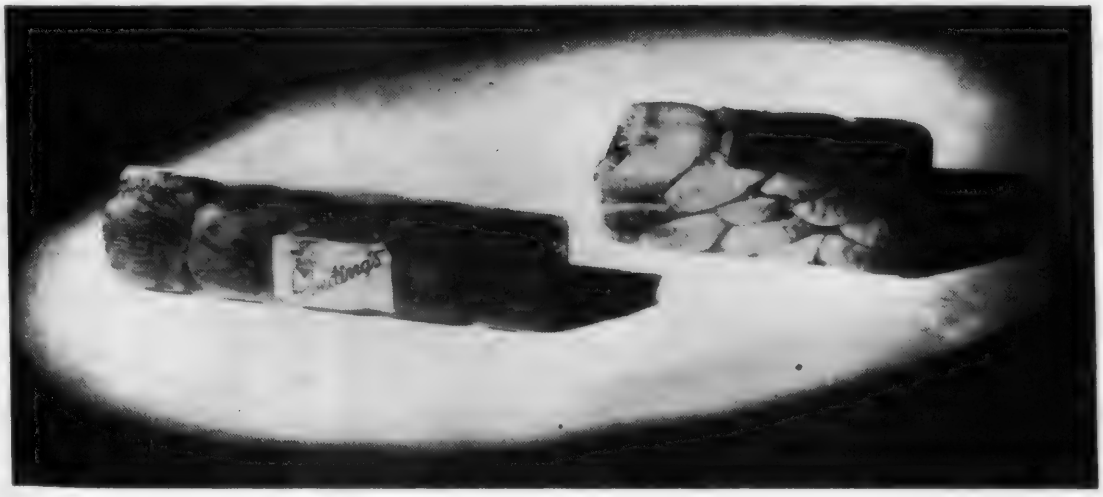
Of purely chemical origin, this thermoplastic material possesses flexibility, moisture-proofness, and resistance to insect infestation, with special properties of its own which render it an ideal medium for food packaging.

It is one of the toughest films made, and will withstand any amount of rough handling without damage to the product. Developed pre-war and produced for the first time towards the end of 1939, polythene film has until now been used solely for war purposes, of which the packaging of Mepacrine tablets (anti-malarial drug) for the tropics forms an outstanding achievement. Irrespective of the hazards, humidity changes, etc., encountered in transit, tablets thus packed always arrived in perfect condition.

Polythene is a British invention, made by Imperial Chemical Industries, Ltd., and is described as a straightforward chemical compound. Transparent or dyed any colour, Polythene is printed and handled in the same way as other flexible films. It is heat-sealable, and may be fashioned into any form of package in general use. Tests made in collaboration with food manufacturers have established the fact that it is an excellent material for food packaging. Production is now proceeding on a big scale, and there will be ample supplies for all purposes in the near future.



Spreading the Alkathene melt.



Pliofilm used as a direct wrapper for figs.

Application of Polythene

A new process for applying polythene coatings to paper and fabrics has been developed by Imperial Chemical Industries. The material is first melted at about 160° C., preferably in an inert atmosphere. After filtering, it is passed into a heated tray, from which it flows on to thoroughly dry paper or fabric. The melt is then spread by means of an adjustable doctor knife.

Papers and fabrics thus coated are glossy, tasteless, odourless, and almost water-white. They act as water-vapour barriers under both temperate and tropical conditions. Paper with a coating weight of about 10 lb. double crown has a water-vapour permeability of approximately 8 gm./sq.m./24 hrs., when tested at 100° F. at 90 per cent. relative humidity, after creasing under a load of 6 lb. per inch of crease. Coated paper can be heat-sealed at 120° to 150° C. The seal is still extremely strong at a temperature as high as 100° C. Heat-sealed containers will, in fact, hold boiling water. High-frequency heat sealing cannot be used with this process.

Wheaten Flour
Its Characteristics and Uses

(*Continued from page* 285)

pectant mother, the infant, and the growing child. They were being widely used in medical practice for these purposes and were being frequently prescribed also for many therapeutic purposes for which the use of the whole of the vitamin B complex rather than that of isolated factors is indicated. There were, accordingly, definite grounds for perturbation in 1942, when the adoption of an 85 per cent. extraction National flour containing the maximum quantity of germ threatened to put an end to supplies of germ. It became apparent, however, that it would be possible to maintain restricted supplies of these undoubtedly valuable vitamin concentrates without robbing the nation's bread of vitamin B_1—a step which would not have been countenanced—by permitting the abstraction of germ from flour intended for self-raising flour and for foods other than bread. During the production of goods from such flours, and particularly of self-raised goods, a considerable destruction of vitamin B_1 occurs, and both the Ministry of Food and the Ministry of Health decided that there was more to be gained than lost by saving the germ of "M" flour from this destructive action. The consumption of the germ as a separate entity enables the whole of the vitamin B_1 to be utilised instead of perhaps only 50 to 60 per cent. of it in the baked goods, and this in effect means not only a conservation of B_1 but the distribution of much of the salvaged vitamin among those who would derive the greatest benefit from it. Furthermore, the proportion of the total flour consumed represented by "M" flour is less the lower the income group, while the overall consumption of "M" flour is only a moderate proportion of the total flour consumed.

It is obvious from the literature on the subject that there exist some opponents to the practice of abstracting germ from "M" flour, despite the fact that a considerable proportion of the contained vitamin B_1 is thereby salvaged. The attitude of these opponents becomes even more surprising to the author when they contend that every ounce of germ should be divided *pro rata* among the population as a whole. Acceptance of this contention would logically require acceptance of the proposition that vitamin C concentrates prepared from blackcurrants, rose hips, and oranges for the benefit of particular sections of the community should be spread over the whole population by being incorporated in jam, and that halibut liver oil and other sources of vitamins A and D should be evenly distributed by being incorporated *in toto* in margarine.

Some of the authors of published statements upon this question of the abstraction of germ from flour are apparently almost fanatically opposed to the continuance of the undoubtedly valuable vitamin concentrates, and it is to be regretted that these writers often are so carried away by their antagonism that they do not bother to acquaint themselves with the facts. On a number of occasions it has been stated explicitly or implied that each ounce of germ that is made available for the preparation of vitamin concentrates represents a corresponding impoverishment of the nation's bread. This is, of course, entirely false. Germ may be abstracted only from "M" flour, which is used in processes which destroy much of its B_1 content, and the Order specifically rules that National flour—which is used to produce our bread—"shall contain the maximum quantity of wheat germ which, having regard to the type of milling plant, can be included in such flour."

English Dried Plums

LITTLE dried fruit is produced in Britain, chiefly because of the unfavourable climatic conditions and the normally abundant imported supplies. However, war-time shortages have stimulated experimental work at the Ditton laboratory of the Department of Scientific and Industrial Research.

The plums are lye-dipped before drying, to facilitate the removal of moisture, and some varieties are sulphured as well. Fully ripe plums give the best produce, and the dried fruit stores well in Cellophane-wrapped cartons.

It is pointed out that, provided the process is economically sound, the huge surpluses of plums which occur periodically could be dried in this way.

Soviet Vitamin Discoveries

PROFESSOR VASSILY BUKIN, D.Sc.

The author of this article directs the vitamin laboratory of the Academy of Sciences Institute of Biochemistry. He is the author of an important monograph on vitamins, published in 1943.

THROUGHOUT the war there was not a single serious outbreak of disease due to shortage of vitamins with the exception of such cases as occurred during the siege of Leningrad in the winter of 1941-1942.

This was due to the very extensive measures that were adopted to supply the army and the people with vitamins. The third All-Union Vitamin Conference was held in December, 1944, at the Academy of Sciences in Moscow attended by over 1,000 representatives of scientific and industrial organisations.

Among the most important measures adopted were the employment of local plant resources for the manufacture of vitamins, the supply of vitamin-enriched foods and vitamins to the army at the front, the exceptionally widespread "victory garden" movement, and the establishment of auxiliary farms at the bigger factories and offices.

Research Work on Vitamins

Despite war-time difficulties research work on vitamins was not dropped. From the 200 papers read at the 1944 conference it could be seen that research continued in all branches—biochemistry and physiology of vitamins, a study of the raw materials and the manufacturing industry, and the use of vitamins in the clinics, dining-rooms, and in cattle-breeding.

The research carried out during the war by the Academy of Sciences' Institute of Biochemistry was considerable. First and foremost must be mentioned the study of the mutual relations between the active group and the protein carriers in the composition of the ferment carboxylase conducted by Engelhardt and Venkstern in 1943.

It was shown that in the molecule of the ferment the two components stabilise each other; the protein protects the active group from enzymic disintegration through the phosphatase, while the active group (diphospho-aneurin) protects the protein from spontaneous disintegration.

This phenomenon is not only of enzymological interest, but it also explains why ferments and the substances in which they cause a division may be found together in cells. Apparently the proteins act as agents protecting certain molecules from the action of the enzymes.

Another study of purely enzymological character was the author's reconstitution of dehydroascorbic acid by fermentation. The ferment "ascorbin-reductase" was discovered and studied; this ferment reconstituted dehydroascorbic acid by oxidising glutathione. This is in turn deoxidised by dihydrocozymase by a non-fermenting reaction and is therefore one of the hydrogen acceptors from the dihydrozymase system. This has greatly extended our knowledge of the mechanism by which vitamin C is converted during the respiratory process of vegetable tissues.

An interesting fact was discovered by Prokoshev in 1944, who was studying the accelerated synthesis of ascorbic acid in cut potato tubers. If the pieces of potato, weighing 1 or 2 g., are retained in a moist atmosphere for three or four days the ascorbic acid content increases from 50 to 100 per cent.

Apple jam being inspected in a Tiraspol cannery.

Investigation showed that this is connected with a burst of respiration, increased revivification of the surface of the cut (formation of suberin), and apparently is one of the manifestations of the protective functions of tissue in response to injuries.

Among the Institute's discoveries of practical importance is that made by Mikhlin (1943), who discovered a new antihaemorrhagic factor in maize stigmata, which he called vitamin K_3. This vitamin is haemostatic for persons not suffering from avitaminosis, and therefore differs from all previously described analogues of vitamin K. There is a great future for the employment of this vitamin in surgery and as a prophylactic preventing haemorrhage. The new vitamin has laboratory and clinical approval, and is now being manufactured as a pharmaceutical preparation.

Development of Drying Methods

Professor Sisakyan, corresponding member of the Academy of Medical Sciences, worked on the important war-time problem of the drying of vegetables. He studied the mechanism of the effect of sulphuric anhydride, and developed new methods of drying cabbage, potatoes, and tomatoes, which retain the vitamin C by sulphitation (which is lost during ordinary drying methods) and which improves the flavour of the dried products and increases their imperviousness during storage to fungus diseases and pests. Balakhovsky and Bulgakov worked on the same problem with the leaves of beet plants (1944) and showed that it is possible to retain carotin as well as ascorbic acid.

Vitamins B and C

Schmuck and Ilyin (1945) showed the possibility of obtaining vitamin B by electrodialysis. As vitamin B is a primary anion it has clearly expressed properties as an electrolyte and under the influence of a direct current moves towards the cathode. This property was used to obtain concentrates of vitamin B from yeast.

During recent years the author developed methods of obtaining vitamin C from vegetable raw material.

A new method of preparing vitamin C from unripe walnuts (with the bitterness removed) was developed and is now used at the Jalalabad vitamin factory in Kirghizia, which was specially built for that purpose; methods of obtaining vitamin C from conifer needles also freed of their bitterness were developed for hospitals, restaurants, or the home.

These discoveries in the field of vitamins will serve to show what is being done in the U.S.S.R. to provide vitamin-enriched food of full value in peace-time.

Some Meat Formulae

J. W. CLARK, A.R.San.I., A.R.I.P.H.H.

Diploma National Federation of Meat Traders' Associations, Silver Medallist Worshipful Company of Butchers.

In view of the large number of enquiries received for formulae for certain meat products, the following typical examples are offered. The art of small goods manufacture does not end with the knowledge of the formula; hygiene must be strictly observed, and the articles produced to an unvarying standard.

Pork Polony.

Lean pork ..	20 lb.	Water ..	5 lb.
Back fat ..	6 ,,	Cornflour ..	1 ,,
Rusks ..	2½ ,,		

The rusks are soaked in the water for one hour. The lean meat, freed from skin and gristle, is put through the coarse plate of a grinder and the fat is cut into ½ in. cubes. The lean pork mix is added to the bowl chopper with 13 oz. of the following seasoning:

Salt	5 lb.	Nutmeg ..	2 oz.
White pepper	2 ,,	Ginger ..	2 ,,
Mace	¼ ,,		

The cornflour and soaked rusks should now be added and the whole chopped finely, after which the cubed fat is added; care must be taken to avoid emulsification. Weasands or artificial casings are then filled and cooked for fifty minutes at 170° F. Should colouring be desired this can be done after cooking by dipping for a few minutes in polony dye. Smoking for two hours improves the flavour of polonies.

Beef and Veal Polony.

Lean beef ..	10 lb.	Cornflour ..	1 lb.
Veal	10 ,,	Rusks	2½ ,,
Beef fat ..	4 ,,	Water	5 ,,
Back fat ..	3 ,,		

To this 14 oz. of the following seasoning is added:

Salt	3 lb.	Ginger ..	½ lb.
White pepper ..	1 ,,	Sage	1 ,,
Nutmeg ..	¼ ,,		

2 lb. finely chopped onion (or onion essence to taste) will greatly improve the taste of this polony.

The method is as for the pork polony, and the mixture is filled into ox runners and cooked for one hour at 190° F.

Polonies may be made from several mixtures of meats—*e.g.* chicken, veal, and pork; ham, veal, and pork, etc.

White Puddings or Milk Sausage.

Oatmeal	12 lb.
Leaf fat	11 ,,
Onions (or leeks)	4 ,,
Flour	4½ ,,
Cornflour	4 ,,
Salt	12 oz.
White pepper	4 ,,
Nutmeg	½ ,,
Small stick of celery (or celery salt)	
Reconstituted dried milk ..	6 qt.

The leaf fat is chopped into ½-in. cubes and the onions and celery are finely chopped. The reconstituted milk is boiled and allowed to cool. All the ingredients, except the fat, are put into a mixer and the whole well mixed with the milk. Finally the fat is added. The mixture is filled into wide hog casings and cooked for twenty-five minutes at 185° F. The sausages may be tied into rings of about ¾ lb. if desired. After cooking, the sausages are hung up for a few minutes to dry off and then cooled quickly in a refrigerator. The reconstituted milk must be boiled up before use to counteract any tendency to separate out during cooking.

A Continental Sausage.

Lean beef	25 lb.
Pork trimmings ..	25 ,,
Beef fat	10 ,,

The meat is coarsely chopped, spread out on trays, and sprinkled with the following mixture:

Salt	2 lb.
Saltpetre	2 oz.
Sugar	2 ,,

The mixture is then placed in a refrigerator for forty-eight hours. It is important to note that the pork must be placed on a different tray from the beef. After the cure is completed, the meat is added to a bowl chopper together with the following mixture:

Pepper ..	5 oz.	Water ..	14 lb.
Thyme ..	1 ,,	Nutmeg ..	1 oz.
Ginger ..	1 ,,	Parsley ..	1 ,,
Rusks	8 lb.	Garlic ..	½ ,,

The rusks are soaked in the water for one hour and cooled in a refrigerator. The whole is mixed well together and filled into weasands. The sausages are then smoked until a light golden brown colour and cooked for fifty-five minutes at 170° F.

Faggots or Spice Balls.

Beef trimmings (about one-third fat)	15 lb.
Cooked "odds and ends" (cooked sausage, lights, liver, etc.) ..	20 ,,
Rusks	3 ,,
Water	6 ,,
Cornflour	1 ,,
Onions (finely chopped) ..	4 lb.
Sage	¼ ,,
Black pepper	2 oz.
Cayenne	½ ,,
Salt	12 ,,
Pinch of nutmeg.	

The beef is minced and placed in a bowl chopper to which is added the rest of the ingredients and the whole is well mixed. The faggots, in pieces about one inch thick or in the form of balls dipped in flour, may be roasted in a tin for forty-five minutes at 300° F. An alternative method of cooking is frying in deep fat.

Meat Plant Refrigeration

(*Continued from page* 290)

assembly, with a total of 1,728 lineal feet of tubing. The four units have a total rated capacity of 90 tons.

Ceiling openings are spaced 30 in. apart and extend the width of the room (across the rails). Return air passes up through a 54-in. wide opening in the fan chamber, which also extends the width of the room.

Although defrosting at the time of the test was done at the four and a half, eight, twelve, and sixteen and a half hours, final schedules were set up for defrosting at the fourth, seventh, tenth, and thirteenth hours, which permitted the units to be shut down about midnight, and gave a sixteen-hour chilling period from the time the first hog went in, or an actual operating period of twelve and a half hours.

In the test the four test hogs were placed in different sections of the cooler and showed no perceptible variation in temperatures. Subsequent operations have indicated that air distribution is uniform.

Ministry of Food

Latest Statutory Rules and Orders

The list given below is the continuation of the list of Orders published in *Food Manufacture*, June 1, 1946, page 242.

No.	*Date.* 1946.	PRICE FIXATION ORDERS
*384	Mar. 23.	Table Jellies (Maximum Prices) Order. * Printed with S.R. & O. 1946 No. 385.
417	,, 22.	Order amending the Bread (Control and Maximum Prices) (No. 2) Order, 1943.
418	,, 22.	Flour Confectionery (Control and Maximum Prices) Order. Revokes S.R. & O. 1944 No. 136; 1945 Nos. 268, 1409.
473	,, 29.	Directions supplementary to the Milk (Control and Maximum Prices) (Great Britain) Order, 1945. Revokes S.R. & O. 1946 No. 191.
484	Apr. 2.	Fish Control and Maximum Prices Order. Revokes S.R. & O. 1944 Nos. 1165, 1391; 1945 Nos. 353, 584, 1444.
509	,, 6.	Order amending the Canned Puddings (Maximum Prices) Order, 1945.
510	,, 6.	Order amending the Oat Products (Control and Maximum Prices) Order, 1945. (Transport between Great Britain and Northern Ireland.)
587	,, 18.	Order amending the Oat Products (Control and Maximum Prices) Order, 1945.
588	,, 18.	Order amending the Cheese (Control and Maximum Prices) Order, 1943.
		FEEDING STUFFS
338	Mar. 8.	Order amending the Feeding Stuffs (Regulation of Manufacture) Order, 1944.
545	Apr. 15.	Order amending the Flour Order, 1945. (Semolina.)
		FISH
508	Apr. 6.	Order suspending Fish (Supplies to Catering Establishments) Order, 1943.
520	,, 9.	Sales (Charges) Order. Revokes S.R. & O. 1944 No. 1173; 1945 Nos. 369, 1473.
		FRUIT
472	Mar. 29.	Imported Cherries Order.
501	Apr. 5.	Imported Pears Order.
517	,, 9.	Tomatoes Order. Revokes S.R. & O. 1945 Nos. 428, 912, 1325, 1326; 1946 No. 325.
612	,, 25.	Order amending the Imported Apples Order, 1945.

No.	*Date.* 1946.	LABELLING
*385	Mar. 23.	General Licence under the Labelling of Food (No. 2) Order, 1944. * Printed with S.R. & O. 1946 No. 384.
		OILS AND FATS
386	Mar. 18.	Order amending the Edible Oils and Fats (Control of Sales) Order, 1944.
		POINTS RATIONING
449	Mar. 27.	Order amending the Food (Points Rationing) Order, 1945.
601	Apr. 23.	Order amending the Food (Points Rationing) Order, 1945. (Matzos; Camembert Cheese.)
		POTATOES
602	Apr. 23.	Order amending the Potatoes (1945 Crop) (No. 2) Order, 1945.
653	May 7.	The New Potatoes (1946 Crop) Order, 1946.
724	,, 18.	Order amending the Potatoes (1945 Crop) (No. 2) Order, 1945.
		RATIONING
589	Apr. 18.	Order amending the Fats, Cheese and Tea (Rationing) Order, 1946. (Camembert Cheese).
590	,, 18.	General Licence under the Food Rationing Orders, 1945-1946.
691	May 15.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1946.
		RESTAURANTS
359	Mar. 15.	Order amending the Meals in Establishments Order, 1942.
		TRANSPORT
538	Apr. 12.	Order revoking the Directions, May 7, 1942, under the Food Transport Order, 1941. (Flour Mixtures.) Revokes S.R. & O. 1942 No. 872.
		VEGETABLES
471	Mar. 29.	Imported Green Vegetables Order.
		VITAMIN C
537	Apr. 12.	Order revoking the Vitamin C (Control) Order, 1941. Revokes S.R. & O. 1941 No. 676.

First step in harvesting the peanuts is the ploughing up of the vines in late summer. This operation shakes off the larger, riper nuts, but these later are harvested by pigs.

The Peanut and its Products

The peanut, scientifically known as *Arachis hypogeae* and more familiarly as the ground nut, is a source of a large number of products. Not only is it of itself a valuable food product and stock food, but it is also used for making fibres for cotton and silk substitutes, and in the packing and casing industries. The peanut is a leading South American cash crop, and coming second is North Carolina in U.S.A.

THE peanut is a native of both Africa and Brazil; one school of horticulturists says that the nut came to America in the breech clouts of the first slaves, while another attributes its arrival to a normal migration over the Isthmus into the Gulf of Mexico country shortly after the discovery of America. In either case it was a "between meal" food of the American negro in colonial days, and was adopted as coverage for swine pasturage by the Gulf cotton planters and Carolina rice growers.

Like cotton and tobacco, the peanut is a 150-day crop; its culture, reaping, curing, and marketing extending from early spring, throughout the summer, and up to Christmas. After cultivation is finished comes the curing season from October. For six weeks the vines are piled in the fields to dry. The crop is then threshed and bagged and sent to the processing plant, where the nuts are first graded. The grading is effected by taking a handful of nuts from each bag: these are weighed and rolled down an incline with different sized holes to sort the sizes; the resulting figures not only place the category of the crop in bulk and oil content but also determine the price.

About 75 per cent. of the American crop this year will go directly to peanut eaters as nuts or contained in confections; the other 25 per cent. goes for food and oil extraction.

Composition

Hutchinson and Mottram give the average composition of peanuts as follows:

The peanut vines are stacked around a stake, where they are left until the nuts are thoroughly cured.

Stacked loosely around the stake, the drying-out process usually takes from six to eight weeks.

When thoroughly dry, the vine and nut are tossed into the peanut "picker." This machine removes the nuts and bales the hay for cattle feed.

	Per Cent.
Water	8·3
Protein	24·0
Carbohydrates	17·0
Fat	44·3
Cellulose	4·5
Mineral matter	1·9

Peanut Meal

Peanut for meal has not yet been produced in appreciable quantities, but it would appear that this may find applications in food manufacture similar to those which have been developed for edible soya products.

The average approximate composition of peanut meal is as follows:

	Per Cent.
Moisture	4·4
Protein	59·0
Fat	9·7
Fibre	2·5
N-free extract	20·6
Ash	3·8

The vitamin and mineral content of the flour is

For processing, the nuts are carried to the top of the plant, then by gravity roll to the bottom, passing through various machines en route for cleaning, shelling, etc.

Still in their shells, the peanuts pass along a conveyor, where imperfect nuts are removed.

The grader shakes samples of nuts through slotted boxes to determine percentage of grades. Prices vary according to size and quality.

After grading the peanuts are bagged for delivery.

given by data furnished by the National Peanut Council, Inc., Atlanta, Ga., as:

	γ *Per Gram.*
Vitamin B_1	6·0
Riboflavin	3·0
Niacin	189·0
	Per Cent.
Calcium	0·065
Magnesium	0·365
Phosphorus	0·565
Iron	0·010

New studies by T. D. Fontaine, Carolyn Samuels, and George W. Irving, Jr., opening broader potential industrial uses for peanut meal, have been described in *Industrial and Engineering Chemistry*. These indicate that peanut oil can be removed without destroying the protein values of the meal, thus making the product available for new industrial uses.

Customary treatments of removing the oil by commercial hydraulic pressing vary in severity, but are usually sufficiently drastic to denature the protein considerably and reduce markedly its extractability.

The studies indicated that critical denaturing temperatures for peanut protein are above 118° C. (dry heat) and above 80° at 100 per cent. relative humidity. Since there appears to be little need for excessively high temperatures and moisture contents to rupture the oil cells of the peanut, it would seem advisable to employ in the mill the lowest moisture content and lowest temperature compatible with adequate oil removal.

In this manner the meal proteins can be preserved in a substantially undenatured state and thus be available for wider industrial utilisation.

The tests were made with a Pearl variety of whiteskin peanuts, selected because they afford certain advantages over the usual redskin variety for many industrial purposes.

Peanut (or Arachis) Oil

The oil obtained from the peanut is very popular in the food industry generally. The very finest "cold-drawn" oil is colourless and possesses a pleasant taste and is greatly used for salad dressings. It is used as cooking oil, oil for sardines, for soap making, a lubricant for textiles, and by watch makers—these are but a few examples, apart from margarine production, of the rising applications of arachis oil.

Peanut Butter

Peanut butter is made from well-roasted peanuts. It is usual to employ a blend of Spanish and Virginia peanuts for this purpose. Four operations are involved in its preparation: (1) roasting and cooling, (2) blanching, (3) cleaning, and (4) grinding.

Peanuts are roasted to the desired colour and then cooled immediately to avoid over-cooking. Blanching is done mechanically and removes the germ and the red skin as well as foreign matter. Afterwards the nuts are screened. It is necessary to subject the nuts to careful picking and cleaning to remove both foreign matter and defective nuts.

The grinding process is devised to provide a product of suitable texture which must be fine and granular. About 1 per cent. of syrup is sometimes added during grinding; this improves the flavour and is said to make the product more stable.

Gases in Vacuum-Packed Food Containers

An apparatus which permits determination of the quantity and chemical composition of the gases in vacuum-packed and gas-packed foods was described in a paper read by L. C. Cartwright, Foster D. Snell, Inc., of New York, at a meeting of the American Chemical Society. The method is applicable to packages of the flexible type, such as laminated sheet materials, and to those of the rigid type, such as metal cans, glass jars with metal, paperboard, or other readily punctured closures.

When applied to a rigid container of known volume, duplicate results agreed to about ±2 per cent. With commercially packed food materials agreement between duplicates was of the order of ±5 per cent. The results corresponded closely to those obtained by the bell-jar method for measuring the degree of vacuum in flexible packages.

The new method may be applied to both large and small containers by the use of gas burettes of suitable size. With careful technique and use of a semi-micro burette reasonably accurate analysis is possible on a gas sample of 1 to 2 ml.

The kinds and amounts of gases present in a number of vacuum-packed foods were determined. The method was applied to the detection of leakage in such packages, as well as measurement of changes in the gas pressure and in the composition and volume of the gas during storage. For example, the extent of evolution of both carbon dioxide and carbon monoxide was determined with a number of samples of coffee. The method permitted the direct determination of the permeability of packaging materials, such as coated paper, Cellophane, and Pliofilm, to oxygen and nitrogen.

The apparatus also proved useful for determining the true density of powdered solid foods in vacuum packages, a property difficult to measure by the usual methods with this type of substance.

Microanalysis

DR. OTTO BISSEY and his associates in New York are developing microtechnique of analysis so that nutrition surveys can be conducted rapidly and objectively among larger population groups, and especially in the schools. Two members of their staff, with assistants, recently took tiny blood samples—about three drops—from the fingertips of eighty students in about an hour, and by the end of the next day had completed accurate analyses for vitamin C, vitamin A, carotene, protein, haemoglobin, and phosphase.

The path to such *expertise* is a long one, and a recently published book* indicates the first steps. Its aim is to give a thorough introduction to the methods used, and considerable space is devoted to the type and size of apparatus required, with many details and clear diagrams to help in making the various parts.

The tables for the separation of the common metals follow the traditional groups so widely used on the larger or macro scale. For those who prefer Mee's arrangement (A. J. Mee, *A New Scheme of Elementary Dual Analysis* [1942]), which dispenses with hydrogen sulphide, there is a separate section and set of tables; with slight modifications to suit the small-scale technique the authors claim that it gives satisfactory results. In the detection of acid radicles they claim no new system, admit the greater difficulty often experienced with mixture, and point out that the reactions used are generally the same as those in ordinary use on the macro scale.

No attempt is made to deal with the theory underlying the principle involved nor are equations given for the reactions employed. Indeed it would be impossible to attempt it in such a small volume at such low cost. The authors contend, with Mee, that the primary object of a course in qualitative inorganic analysis should be to teach it and not to use the methods merely as pegs to carry the theory of physical chemistry. Spot tests are therefore given freely among the confirmatory tests for all the cations and some of the anions as well.

A number of advantages are claimed for the micro system over the ordinary macro procedure, and there seems to be no reason why it should not be universally adopted. This depends entirely on how quickly the proper manipulative technique can be acquired. The whole purpose of the book is to stress the method and show how simple the processes are.

This system is in use at important technical institutes and has created wide interest in schools. Dr. Wilson has aroused great enthusiasm in lecturing on the subject, and is so confident of enlisting further converts that he has offered to arrange demonstrations at the Sir John Cass Technical Institute, or elsewhere if convenient, to science teachers or parties of visiting students.

For working through the tables a fair elementary knowledge of chemistry is necessary, but there is no reason why the technique should not be acquired gradually at a much earlier stage.

The book convincingly accomplishes its aim, which is to indicate the first steps towards facilitating the learning of a comparatively new technique in analytical chemistry.—B. H.

* *Qualitative Inorganic Microanalysis.* By Ronald Belcher and Cecil L. Wilson. Pp. 68+viii. London. 2s. 6d. net.

Communal Eating

THAT the British Restaurant service, which develloped as part of a national food policy in war-time, should now be overhauled and made a more effective part of food policy and so help to keep the nation fit for the constructive tasks of peace is the final conclusion contained in a booklet* publishing the results of an enquiry made by the National Council of Social Service into the extent and character of this service.

Started at the time of the bombing of London in 1940, the restaurants increased in number until within four years 2,000 were in operation, becoming an invaluable means of supplementing the rationed diet for industrial and office workers who formed the majority of people making use of the service.

Although popular with the public, the catering trade did not look so kindly upon the British Restaurant, and the report contains the results of a questionnaire asking for opinions from commercial caterers. Perhaps the examination of the views of the catering trade may serve a useful purpose in making clear the distinction that a service which is run primarily for trading results is the province of commercial enterprise, while a service primarily conducted for its social results must be operated in such a way that the public interest takes precedence.

It is clear that the return to normal of the food position is as yet undefined, and conditions may compel a continuance of this communal "eating out." Whatever the future of the British Restaurants, many useful lessons may be learnt from the experiences gained during the six years of their existence.—J. R.

* *British Restaurants.* An Enquiry made by the National Council of Social Service. Pp. 86+ix. London. 3s. 6d. net.

BOOKS RECEIVED

Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists. Sixth Edition.

Food Analysis. By A. G. Woodman. Fourth Edition. Sixth Impression.

Modern Packaging Display

EXHIBITION IN GLASGOW

EVIDENCE of a gradual development of export trading in certain of the food industries was seen at the modern packaging display in Glasgow on May 15 by Andrew Ritchie and Son, Ltd.

In the hardware and electrical fields full scope has been given the designers and manufacturers to plan new and very useful containers for the products within these groups, many of which were on show. The same opportunity has not yet been allowed the food industries, although many new developments are pending the release of paper, the availability of foods, and the authority of the Government to put these to use, both for home and export trade.

A small beginning has been made in the resumed production of chocolate boxes for export. These follow pre-war lines to a considerable extent and are normal type boxes for this purpose. Coming

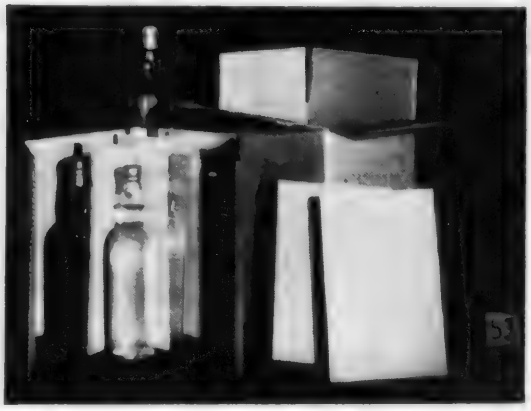
developments suggest that much greater use will be made of "see-through" papers for confectionery, chocolate, and food packing, and considerable attention is being devoted to this for future designs.

During the war the firm turned out an immense

quantity of containers for bulk storage of smaller units, and a great many of these were on show, covering almost every type of food product and demonstrating the need for individual design and attention to the particular requirements of each field. A very considerable volume of work is still being done for the Ministry of Food as well as for

many of the major Scottish manufacturing companies.

Whisky boxes for export trade, particularly to the U.S.A., were prominent. Many of the leading exporters prefer a square box with a hinged top taking a single bottle, bearing the distinctive brand label of the bottle. Other bottle packs for bulk



transport included one in which bottles were held, top and bottom, by inverted trays punched with holes. Through these holes the bottles were placed, alternatively, upright and upside down, giving the structure a rigidity which was further improved by an intermediate central surround. This type of container absorbs shocks and has a very high record of safe transit. Another whisky case, of wood,

had a corrugated lining and double corrugations between bottles, thus adding the shock-absorbing qualities of the corrugation to the strength of the wood. Such cases could equally well be made, and are made, with an all-corrugated outer container.

Other tray-type containers on show include jam trays (which are not at the moment permitted) and a tomato tray, in which air-holes are punched in the sides to ensure proper ventilation. Among the many packs for bulk carrying of foodstuffs were corrugated or stitched rigid boxes for sugar, biscuits, evaporated milk, salt, puddings, and porridge oats. Naturally the strength and size of the exterior container varies in such instances with the internal pack which is carried.

One interesting pack was that for oatcakes, in that these normally fragile cakes were not protected by internal corrugation, the strong circular boxes being in themselves adequate protection, while the cakes give each of the boxes a measure of rigidity. Attention is now being devoted to the practicability of utilising a plastic or resin in the preparation of boards for these purposes to give increased resistance and protection.

Design and decoration of containers has been limited and is still limited by the prevailing conditions, for which reason these displays are still largely utility—with one, or at most two, colour printings. There is a trend again towards the adoption of trade and publicity matter on containers, and this must continue until the materials position improves.

One container, announced by the firm although not on show, is a kipper carrier. The development of the dried, quick-frozen, or dehydrated fish, meat, and fruit industry obviously offers considerable scope for container makers, and it is therefore interesting to note that kippers are being packed in board instead of the more generally used wood.

Society of Chemical Industry

FOOD GROUP SUMMER OUTING

SOCIAL functions interspersed with the reading of scientific papers, a visit to two factories, a research institute, and a college of agriculture, comprised the programme of the first post-war summer meeting of the Food Group held from May 30 to June 3, 1946.

The factories visited were those of Carr's Biscuit Works at Carlisle and the yeast factory of the Distillers Co., Ltd., Glenochil.

According to arrangements made by the Nutrition Panel, an evening at Ayr was devoted to the reading of a series of papers on the nutritive properties of different foods. Dr. V. L. S. Charley spoke on fruit and fruit juices; yeast, beer, wine, and spirits were discussed by Mr. H. J. Bunker; Mr. H. C. S. de Whalley followed with a paper on sugar and confectionery, and the last paper read was by Mr. W. B. Walker on cocoa and chocolate.

A morning and afternoon were devoted to visits to the Hannah Dairy Research Institute at Kirkhill and the West of Scotland College of Agriculture, Auchencruive, and the evening members visited the Alloway Cottage of Robert Burns and his memorial by the Brig of Ayr.

Sunday, June 2, was occupied by the journey from Ayr to Stirling, the road taking in Erskine Ferry, Balloch, Loch Lomond, Arrochar, Crianlarish, Glen Ogle, Lochearnhead, Callander, and Aberfoyle.

A farewell dinner was held at Edinburgh on June 3, at which Mr. Theodore Rendle, chairman of the Group, paid tribute to Dr. J. H. Bushill, Mr. L. H. G. Barton, Mr. H. S. Rooke, and others whose work and good organisation had ensured the outstanding success of the meeting.

The photograph shows the entire party at the Hannah Dairy Research Institute.

New Type of Jam Can

REQUIRES NO CAN OPENER

A new type of jam can which only needs a slight pull on the lid to open it has been devised and manufactured by the Metal Box Co., Ltd., and is now appearing on the market. No key or can-opener is required; it may be resealed by putting the lid back on the can and pressing lightly, when it snaps back into position.

The practice of marketing jam in cans for home consumption has increased considerably during the war years. At the moment there are in use two distinct methods of packing. The first method is to fill the jam into the normal hermetically sealed food can at a temperature of 180° to 190° F., after which the loose end is seamed on immediately and the can inverted so that the hot jam sterilises the end which has just been applied. The cans are then stacked and allowed to cool.

The other method, for which this new type of can is intended, is to fill the cans at the above-mentioned temperature and cover the top of the jam with a grease-proof paper tissue. The cans are then stacked and allowed to cool completely. When the jam is cold the snap-on lids are applied. If the jam is not completely cold before the cans are closed, condensation is likely to occur on the inside of the cover, which in turn may lead to the development of mould on the top surface of the jam. The reason for the appearance of mould seems to be that when condensation occurs, the drops of moisture formed fall on to the surface of the jam and dilute small patches to below the sugar concentration, which inhibits the growth of mould spores. It is assumed that spores are always present and eventually gain access to the top surface of the jam, but in the absence of the dilution referred to are unable to develop.

The lid is either (*a*) a solid metal cover, which allows the jam to breathe slightly, as by design it does not fit tightly on to the top of the can, or (*b*) when paper restrictions permit, an alternative closure consisting of a snap-on ring with an aperture of approximately $2\frac{3}{8}$ in. diameter.

This aperture is closed with a special porous pasteboard disc fitted in the ring from the inside, which gives a tight seal but allows the jam to breathe through the porous board and obviates condensation. The board used must be neither glazed nor heavily sized, but a design can be printed on the upper side of the disc if this is required. Both forms of containers can be supplied in plain or decorated tinplate. The bodies, whether for full cover or aperture closure are identical—that is to say, lacquered internally and plain, lacquered or decorated externally. At the moment the seamed-on and snap-on covers can be plain or lacquered; at a later date it is hoped to provide snap-on covers coated or decorated.

The new snap-on lid jam can, in addition to not requiring a tin-opener, has no jagged edges or jam-concealing lip after the can has been opened. Furthermore, it has a large filling orifice, constant capacity, and, if decorated externally, obviates labelling. Above all, it has a reseal closure which can be used again and again. When empty this useful container may be used for sugar, spices, etc., and remain a constant advertisement for the jam manufacturer.

Obituary

The death has been announced of Mr. Thomas Henry Willcox, chairman and managing director of the firm of W. H. Willcox and Co., Ltd.

Economic Bureau for Palestine

The Economic Bureau for Palestine, which represents the official organisations of Palestinian industry, trade, and finance in this country, has been established in London to facilitate and develop economic and financial relations between the United Kingdom and Palestine.

The Bureau will provide up-to-date economic information on Palestine, and will function as a Liaison Office and Information Centre for both Palestinian organisations and official bodies in the United Kingdom.

Documentary Films

Since about 1929 the documentary film has played an increasingly important role and has become established as a medium for education and information. Instructional films were used for training and educational purposes in the services and for exhibition to doctors, nurses, farm and factory workers, civil defence workers, firemen, and to other specialised audiences.

Altogether some two to three thousand official films of this kind have been produced since 1940 for the Ministry of Information, the services, and the British Council, in addition to the films which a number of industrial and other sponsors have continued to commission.

The Federation of Documentary Film Units was set up early in 1945 by eight independent companies, and one of its primary aims as an organised body representing the technical side of documentary and educational film-making is to facilitate the co-operation of sponsor and film-maker and to contribute to the full use of the technical skill available. The Federation is publishing periodical bulletins giving available information on the different aspects of documentary films, their second one, dated April, 1946, treating of films in health and medicine.

The Institute of Physics

At the annual general meeting of the Institute of Physics held on May 29, 1946, the following were elected to take office on October 1, 1946:

President: Prof. A. M. Tyndall; *Vice-Presidents:* Prof. J. A. Crowther, Dr. H. Lowery, and Mr. A. J. Philpot; *Honorary Treasurer:* Mr. E. R. Davies; *Honorary Secretary:* Dr. B. P. Dudding; *New Ordinary Members of the Board:* Dr. A. McCance, Mr. W. S. Vernon, Dr. F. A. Vick. Dr. G. F. C. Searle, F.R.S., was elected an Honorary Fellow of the Institute.

The Institute's Report for 1945 records the conference on "Instruments for the Automatic Controlling and Recording of Chemical and other Processes," and also other matters considered during the year.

Reconversion of Industry

FOOD MACHINERY FOR EXPORT

A factory, on the Radcliffe-Bolton road, which was built for the purpose of producing guns, and until November last was devoted to the production of guns, tank details, and other munitions, has been taken over by Mather and Platt, Ltd. Machines which will play an important part in harvesting and preserving the 1946 food crops of many European countries are being delivered from the factory.

Although in due time the Radcliffe factory may produce other specialities, the output of completed machines is at present almost exclusively connected with the Food Machinery Department. It is expected that nearly forty pea viners will be delivered in time for the 1946 season. A few viners have already left the factory for several Continental countries. Machines ready for delivery to Sweden and Norway, and some for France and other European countries are well in hand. Automatic sterilisers are under construction for France and Belgium.

Examining a pressure cooker at the Radcliffe Works of Mather and Platt, Ltd., which is being sent to Belgium. The Mayor of Radcliffe is on the right and behind him is Mr. Loris E. Mather.

Courtesy Kemsley Newspapers, Ltd., Manchester.

Fish Meal Industry Develops

The development of the fish meal industry, as an alternative outlet for surplus fish, has been increasingly improved in the main fishing ports and is now an important additional source of feeding stuffs for the livestock industry.

Details recently issued regarding the Aberdeen outputs show that this port alone is producing from 50,000 tons of raw material, little of which is condemned fish. Earlier it was the practice to regard as fit for manure or feeding stuff production only condemned and unsaleable fish, but relatively little of this raw material is unfit for consumption. Now glut periods provide an addition to the acutely limited grain feeding reserves, and are welcomed throughout the country by manufacturers of compounds, who blend the fish meal with their other ingredients.

The plant in use is similar to that used in modern dehydration and manufacturing processes.

There are three main factories at Aberdeen engaged on this work, which is likely to increase in importance with the continued shortage of feeding stuffs.

"The Furnaceman's Manual"

As a companion to "The Stoker's Manual," which has proved of considerable value, the Ministry of Fuel and Power has now published "The Furnaceman's Manual," designed to foster a higher standard of skill in the efficient and economical handling of furnaces.

The Manual deals first with the various types of furnace fuel in general use and then with the general principles of combustion, covering the supply of air, how fuels burn, the products of combustion, the temperature of ignition, and the nature of flame and flame temperature.

Under general principles of heating are considered heat and temperature, measurement of temperature and measurement of heat, heat capacity, heat transmission, and heat storage.

The next section of the book deals with practical aspects of the burning of the various fuels—solid fuel, gas (crude, town, coke oven), pulverised fuel, and liquid fuel, followed by an important section on furnace draughting, and concluding with a guide to the loading of furnaces and useful information on maintenance and records.

The Manual is illustrated, and copies are obtainable free on application to the Regional Offices of the Ministry of Fuel and Power.

Food Machinery Industrial and Export Group

A representative gathering of the food machinery industry took part in the luncheon given by the Food Machinery Industrial and Export Group at the Savoy Hotel on June 6. The chairman, Mr. E. H. Gilpin, in his speech gave some details of his mission, in company with Mr. F. C. Fitzpatrick and Mr. Norman Neville, to South Africa, and commented upon the great desire of those concerned in collaborating with British manufacturers.

In proposing the toast of Mr. H. A. Marquand, M.P., Secretary for Overseas Trade, he expressed his appreciation of the help that had been given by his Department.

Mr. Marquand replied in an entertaining speech, during which he expressed a high degree of optimism as to the future of British exports.

OBITER DICTA

● Am I right in understanding that there is some sort of trouble about food at the present time?—*Mr. C. Williams, M.P.*

● Famine will soon be killing civilians and turning out future fascists more quickly than Hitler and Mussolini ever managed to.—*Mr. Herbert Morrison.*

● Today people are clamouring for more milk. The nation has become milk conscious.—*Sir Thomas Baxter, chairman of the Milk Marketing Board.*

● We are going to crack down heavily on all forms of black marketeering in food.—*Ministry of Food Official.*

● I found when I went to the Ministry of Food that two most innocuous articles of diet, bread and milk, were those that seemed to generate the most heat.—*Lord Llewellin.*

● For some time the only colour in the shops has been the poor little radish, surrounded by roots and tubers.—*Mr. H. R. B. Belben, president of the Southern Fruit and Potato Merchants' Association.*

● The Roman people were given bread and circuses to keep them quiet; the British people were given circuses on June 8, but rather less bread than they would like.—*Caterers' Association Bulletin.*

● I am not going to say that a pint of beer is better for you than a pint of milk. I would only point out that it is a much safer drink as very few organisms grow in it.—*Mr. H. J. Bunker, speaking at the Summer Meeting of the Food Group of the Society of Chemical Industry.*

● We on these benches warn the Government that they cannot for ever feed people on victory parades and on promises of variety and good things to come at a time when in fact queues grow longer, shortages are increasing, and the real cost of living, unlike the phoney Crippsian index, is steadily rising.—*Mr. R. S. Hudson.*

● I think people conducting a recent experiment on how long a human being could be kept healthy without vitamins saw that the human guinea-pig was remaining in good health so long that they stopped the experiment because they feared to vitiate all they knew about vitamins.—*Lord Horder, speaking at the Industrial Catering Association's conference.*

The Dairy and Ice Cream Equipment Association

Reverting to its former custom of holding social gatherings, which had been interrupted during the war years, the Dairy and Ice Cream Equipment Association held its first post-war dinner at the Connaught Rooms on June 12.

The Association had been fortunate in securing two speakers for the evening, Mr. J. Matthews and Mr. Norman Neville, who had recently toured the Union of South Africa. Introduced by the chairman, Mr. H. A. H. Crowther, both speakers gave their audience an interesting account of social, political, and industrial conditions in the Union. Mr. Neville commented upon the difficulties arising from the relations between the British, Afrikander, Native, and Indian communities. Mr. Matthews gave a general account of conditions as he saw them and recounted some amusing experiences.

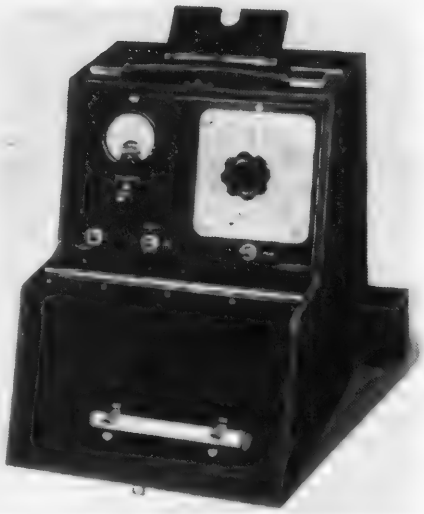
Flour Cuts and Unemployment

Indications from bakery and allied industry employers in Scotland suggest that a considerable volume of unemployment among operatives will be the first effect of the enforced cuts in production resulting from reduced allocations of flour, fats, and sugar. Biscuit manufacturers will be especially severely hit, since their products demand a higher proportion of these products than bread, where the dislocation will be comparatively less.

Of the existing six plants owned by one company only four and a half are now in current use in view of shortage of materials. The further cuts now operating will mean that the work will be handled by three of the plants instead of four and a half and that the workers concerned must be either maintained on short time or alternatively become unemployed. Another index to employment in the industry is given by the fact that this firm employed 850 workers pre-war, and have now, previous to any further cuts, only 400 workers.

All the evidence therefore suggests that biscuit makers are likely to experience a very difficult period.

Moisture-in-Grain Meters



Calibrated for grain and made in two types —mains operated and battery operated — the moisture-in-grain meter illustrated here was shown at the exhibition recently organised by Marconi Instruments, Ltd.

The instrument operates in principle upon the effect of moisture on the dielectric properties of wheat, oats, or barley. Direct readings, accurate to ±1 per cent. are obtainable for most types of English grain. Several tests can be made in the space of a few minutes.

The meters may be employed at any time after the harvest—or even before in the case of combine-harvesting. They will determine the condition of the grain for storing or maintain a check on its moisture content during drying. The instruments may be applied to grain for feed, or for seed and malting, and are equally effective for the requirements of the cereal and milling industries. It is probable that, in the future, the applications of these meters will by no means be confined to grain.

Mr. E. B. Bennion

Mr. E. B. Bennion has now left the National Bakery School, Borough Polytechnic, to take up his new appointment as production manager with H. W. Nevill, Ltd.

I.P.C.A.—Appointment of Officers

At the recent annual general meeting of the Industrial Pest Control Association the following were elected as the Officers and Executive Committee for the ensuing year:

President: Mr. Angus F. McIntosh (Thomas Harley, Ltd.).
Vice-President: Mr. G. McLaren (Haller Laboratories, Ltd.).
Hon. Treasurer: Mr. S. F. Sprange (London Fumigation Co., Ltd.).

Executive Committee:

Mr. K. G. Anker-Petersen (British Ratin Co., Ltd.).
Dr. F. P. Coyne (Imperial Chemical Industries, Ltd.).
Mr. W. Hivey (Hivey Fumigation Co., Ltd.).
Mr. C. S. Kregor (W. Edmonds and Co., Ltd.).
Dr. T. F. West (Hygiene Chemical Co., Ltd.).
Dr. E. Holmes (*ex officio*) (Plant Protection, Ltd.).

Mr. Sydney H. Jones

Mr. Sydney H. Jones, a director of William Pender, Ltd., Edinburgh, has been elected chairman of the Edinburgh branch of the Incorporated Sales Managers' Association.

During the war Mr. Jones was representative of the Scottish manufacturers on one of the Advisory Committees of the Ministry of Food, and for eight years has been a National Council representative of the Scottish Commercial Motor Users' Association. He is now National Council representative on the Traders' Road Transport Association.

Aluminium Development Association

The Wrought Light Alloys Development Association has now been absorbed into the Aluminium Development Association, and the office at 68, Temple Row, Birmingham, 2, has been closed down.

All future correspondence should be addressed to the Association at 67, Brook Street, London, W.1.

Mr. William Rowan

Reads, Ltd., of Liverpool, have appointed Mr. William Rowan as works manager of their keg and drum factory. Mr. Rowan was joint works manager with Metal Containers, Ltd., prior to joining the Anglo-Iranian Oil Co., Ltd., in 1942, as Drum Plant Superintendent for the War Office at Haifa, Abadan, and Suez.

Motor Jubilee President

The Society of Motor Manufacturers and Traders has elected Mr. H. L. Kenward as its President for the motor industry's Jubilee Year.

Mr. Kenward is a director of the Dunlop Rubber Co., with which organisation he has been associated for thirty-five years. He is a member of the Government's Rubber Consultative Committee and has been prominently connected with the rationing and supply of tyres for service and civilian requirements during the years of rubber shortage.

Starch Syrups

Food manufacturers are making increasing use of starch syrups prepared by enzymic conversion of starches and flours. With the aid of Bacterase, sweet syrups are easily made, since it converts flours and starches to a mixture of dextrin and maltose. Such nutritious sweet syrups are useful both to aid economies in sugar and also from the practical standpoint of producing desirable qualities of texture and baking properties. They are incorporated in standard recipes for the manufacture of flour and sugar confectionery of all types, including biscuits, cakes, sticky breads, etc. Converted starch syrups made with the enzyme are also used as a base for invalid and baby foods, prepared coffees and other beverages, and for many similar specialities. Syrups are easily prepared in any simple mixing plant which may be conveniently available and are generally used on the spot as made.

Bacterase is extremely useful in all processes involving the liquefaction and conversion of starch, and is manufactured by Norman Evans and Rais, Ltd., from whom an informative booklet on its properties and applications may be obtained.

PATRA'S New Research Centre

TO BE READY BY 1947

Work has begun on the new research centre at Leatherhead in Surrey for the Printing and Allied Trades Research Association.

The 4½ acre site on which this two-story, steel-framed bricked and concrete building is being erected adjoins sites which will be occupied by buildings housing the Food Manufacturers' Research Association, the British Coal Utilisation Research Association, and the British Electrical Research Association. The new building will be approximately 200 ft. long by 50 ft. deep.

The laboratories will be on the ground floor. Of particular interest is the Technological Laboratory. Its floor will be the basement (to house heavy machines) and will extend through the ground floor, being topped by a 20 ft. high ceiling, thus enabling tall machinery to be installed. Its 2,000 sq. ft. of floor area will contain printing, packaging, and package-testing machinery, manned by practical operatives. It will thus form the link between the scientists in their laboratories and the application of their experiments and discoveries under everyday workshop conditions comparable with those under which the ordinary printer and package-maker and user works.

In a constant humidity laboratory paper-testing, packaging, and similar work will be carried out, in which the behaviour of materials under controlled conditions must be studied.

Tests to determine the penetration of packages by water and other liquids, water-vapour, gases, etc., will be made in a permeability laboratory. Experiments on the mechanical and printing properties of paper will be undertaken in the paper laboratory.

The working properties of inks, improvements in stereo-moulding, and in adhesives will be subjects of research in the rheology laboratory. These five laboratories—technological, constant humidity, permeability, paper, and rheology—will be air-conditioned at 65° F. and 65 per cent. R.H. from a large central air-conditioning plant.

In the optics laboratory there will be research into the opacity and gloss of paper, into the quality of print, and into colour measurement. Research into electrotyping, photogravure, and photo-process etching will be conducted in the electro-chemistry laboratory, while litho and photo-litho processes and materials will be dealt with in the surface chemistry laboratory.

Then there will be two general research laboratories, analytical, photographic, microscopy and mycological laboratories, and a laboratory for special investigations to deal with the steadily increasing flow of individual-job problems which PATRA receives from its members.

Finally, the laboratory side of the building will also house two variable humidity and temperature laboratories, where it will be possible to reproduce every kind of climate from the arctic to the tropical. The value of these laboratories, especially in packaging research and for research into printed matter intended for display or use in any of Britain's export markets, is self-evident.

The new research centre will, it is hoped, be completed and occupied sometime in 1947.

"Frood"

Passengers on British South American Airways liners are now being served with Frood, the new tag for food which has been cooked and frozen until needed.

Lyons helped with experiments, and the General Electric Co. designed a special oven for heating Frood in the galley of the aircraft.

Frood will be on sale in British shops when the food crisis is over. Housewives will be able to buy in a packet Irish stew, two vegetables, and sweet, which they can heat and serve in twenty minutes.

Butter Discovery

A new process for keeping butter in hot climates by making "hard butter" and tinning it has been developed by British scientists.

Water is removed from the butter by centrifugal force at well below boiling point, the last trace being taken out by boiling in a vacuum. This prevents the action of bacteria and rancid smells and flavour which normally develop when butter is heated and kept.

A little peanut oil and salt are added to the dry butter fat, the molten mixture is passed through vacuum vessels, and it is then cooled and tinned. It is claimed that the resulting preparation can be spread on bread in a wide range of temperatures, and that water can be beaten in so that it is practically no different from ordinary butter again.

War-Time at Baker Perkins'

A handsomely produced booklet, issued by Baker Perkins, was planned not only to give their own staff some record of what their teamwork produced but also to give their clients some idea of the extent of the change-over needed to return to peace-time production. Most of the pictures and stories are concerned with military equipment, but there is also an account of the production of 205 mobile bakery plants, with the 615 mobile ovens required to make them efficiently balanced units. The transportable type of field oven known since 1866 as the "Polly Perkins" and other bakery equipment are also mentioned.

B.E.T.R.O.

At the first ordinary general meeting of members of the British Export Trade Research Organization the following retiring members of the Council were automatically re-elected:

Mr. F. C. Burstall (Automatic Telephone and Electric Co.).
Mr. Ivor Cooper (Lever Brothers and Unilever).
Mr. W. H. F. Emmett (W. H. Emmett and Company).
Mr. Leslie Gamage (General Electric Co.).
Mr. Clifford Harrison (Horlicks, Ltd.).
Major G. Harrison (London Press Exchange and Cadbury Bros.).
Mr. H. de B. Monk (I. and R. Morley).
Mr. Norman Moore (S. H. Benson, Ltd.).
Mr. G. N. Samuelson (Reckitt and Colman, Ltd.).

Three additional members were nominated and elected as follows:

Mr. F. P. Bishop (Joint Managing Director, Broadcast Relay Service, Ltd.).
Mr. J. P. Ford (General Manager, British Engineers Small Tools and Equipment Co., Ltd.).
Mr. C. J. Savill (Director, The Durham Timber Co., Ltd.).

Changes of Address

C. W. Field, Ltd., have now moved to their new works and offices at Edwards Lane, Speke, Liverpool, 19. Telephone: Hunts Cross 1345-7.

▪

A new office has been opened by Elliott Brothers (London), Ltd., at 72, Victoria Street, Westminster, London, S.W.1. Telephone: VICtoria 6093-4.

▪

The offices of the British Tar Confederation are now at Artillery House, Artillery Row, London, S.W.1. Telephone: ABBey 3731-2.

▪

The official address of the Export Licensing Branch (Board of Trade), is now Stafford House, 14-20, King William Street, London, E.C.4 (Mansion House 4555), to which address all communications should be sent.

▪

Messrs. Albert E. Evans and Co., Ltd., are now operating from 130, Hewitt Road, London, N.8.

Promotion of Export Trade

EXHIBITIONS AND FAIRS

The committee appointed by the Secretary for Overseas Trade to consider the part which exhibitions and fairs should play in the promotion of export trade in the post-war era has recently produced its report, which has now been published as a White Paper. The committee, composed of members broadly representative of trade and industry, was under the chairmanship of Lord Ramsden; their report covers the whole field of prestige and trade displays, and deals with the questions of international exhibitions and trade fairs both at home and overseas.

Of particular interest at the present time is the recommendation that a Universal International Exhibition should be held in London in 1951, or as soon thereafter as may be practicable. Such an exhibition should have for its purpose the demonstration of our recovery from the effects of the war in the moral, cultural, spiritual, and material fields. An exhibition held in London in that year would also serve to mark the centenary of the great International Exhibition held in Hyde Park in 1851 on the initiative of the Prince Consort and the Royal Society of Arts.

The report urges the need for a national trade fair, and recommends that this need should be met by the revival of the annual British Industries Fair, to be held in May, but with certain changes in its constitution and practice to improve its appeal. The first post-war fair will be held in 1947. The main features in the Fair should, it is recommended, be varied annually as far as possible, and different industries should be given opportunities of staging corporate displays in central positions to give special character to the Fair.

The committee express the opinion that official national exhibits are out of place at international trade fairs, and recommend that United Kingdom industry should be left to decide for itself whether and to what extent it will participate in such fairs. The Government should undertake official participation only when industry intends to participate on an adequate scale and on the occasion of some exceptional and outstanding event (such as the centenary of a trade fair) in which there is reason to expect official participation.

Other recommendations relate to the assistance to be rendered by the Government with regard to (*a*) industrial exhibitions organised in this country by representative trade associations and (*b*) exhibitions of United Kingdom goods in overseas markets.

Food Group

At the fifteenth annual general meeting of the Food Group on April 17, 1946, the Hon. Secretary reminded members that Professor B. T. P. Barker was retiring from the chairmanship of the Microbiological Panel, and expressed, on behalf of the Committee and of the Group, the great debt of gratitude which was owed to Professor Barker for his sustained efforts in furthering the interests of the Panel during the last three years of war. Professor H. D. Kay was welcomed as the new chairman of the Microbiological Panel.

An appreciation of the continued efficiency of Mr. J. G. Huntley as the Hon. Recorder of the Food Group was also expressed.

The following is the list of Officers and Committee of the Food Group for the Session 1946-1947:

Officers:

Chairman: Mr. T. Rendle.
Vice-Chairman: Dr. H. E. Cox.
Hon. Treasurer: Dr. J. R. Nicholls.
Hon. Editor of Food Group Proceedings: Mr. T. Rendle.
Hon. Secretary: Dr. J. H. Bushill.

Committee Members:

A. J. Amos.	T. Moran.
A. Andersen.	R. H. Morgan.
B. M. Brown.	H. Nicol.
L. E. Campbell.	S. J. Rowland.
J. G. Davis.	R. G. Tomkins.
S. H. Edgar.	S. M. Tritton.

Food Education Society

Publication of the following Resolution, which was passed at a recent meeting, has been authorised by the Executive Council of the Society:

"The Food Education Society is anxious that Government Departments and Local Authorities should realise the vital importance of freshly gathered vegetables and salads in the nutrition of the people. It is considered that new housing estates should have adequate provision for allotments and back gardens, and that every care should be exercised in retaining the 'top spit' on all housing estates so that gardens may have the maximum productive capacity. We urged that as many as possible of the existing allotments should be retained, and that where it is essential to take them for building or other purposes alternative land should be provided.

"It is generally agreed that the cultivated gardens and allotments provide a healthy recreation for the citizen, but the Food Education Society regrets that the great value in health and well-being to the cultivator's family by having available freshly gathered protective vegetables and salads is not usually appreciated.

"It is further recommended that an energetic campaign be commenced during the coming season to interest demobilised service men and persons returning from factory work in the advantages of having their own supply of fresh vegetables and salads."

Jubilee of the B.T.H. Company

The fiftieth anniversary of the British Thomson-Houston Co., Ltd., was celebrated in May, the company having been formed on May 18, 1896, from an organisation which had developed from the original London firm of Laing, Wharton and Down, which started trading in 1886.

New Mercantile Credit Company

With a nominal capital of £100,000, the formation of the Mercantile Credit Company of Ireland, Ltd., is announced. The company will operate in Ireland, its services being the same as those offered by Mercantile Credit Co., Ltd., of London. These include finance, medium and long term by hire purchase and other suitable methods, whereby the industrial and commercial user may acquire machinery, equipment, and motor vehicles, paying for them out of the earnings or savings they effect.

Joseph Travers and Sons, Ltd.

At the ordinary general meeting of Joseph Travers and Sons, Ltd., at which Mr. Frank Travers, the chairman, presided, it was announced that for the eleventh successive year a dividend of 15 per cent. on the Ordinary stock was recommended. The pensions and provident reserve was increased to £59,610 by the allocation of £2,500 made out of the past year's profit. The development reserve had been strengthened by the allocation of £10,000 from profits and now stood at £40,000, while the general reserve and war contingencies reserve remained at £250,000 and £60,000 respectively.

Biscuit designs by Kathleen Darby of Richard Lonsdale-Hands Associates. This is the first time that a professional industrial design house has been used to style the pattern of biscuits.

Smithfield Animal Products, Ltd.

At the twenty-sixth annual general meeting of Smithfield Animal Products, Ltd., Mr. W. W. Halliday (the chairman) reported continued improvements in the trading results of the company for the past year. The profit, after taxation, but before transfer to reserve, amounted to £13,375, compared with £6,444 for 1944. A dividend for the year of 15 per cent. less tax, was recommended.

Cerebos, Ltd.

Presiding over the forty-second annual general meeting of Cerebos, Ltd., Sir William Collins said that the results of the subsidiaries for 1945 having been brought into the accounts of the parent company the profit was £446,768; from this had to be deducted income tax amounting to £222,930, leaving £223,833, as compared with £201,464 for the previous year. Adding the amount brought forward, £297,579 was available for distribution, which enabled them to propose the same dividend as for the past eleven years—that is to say, 40 per cent. (10 per cent. of which had already been paid as an interim dividend)—and to carry forward the sum of £82,579.

Maypole Dairy Co., Ltd.

In the course of his annual review circulated at the forty-eighth annual general meeting of the Ordinary shareholders of the Maypole Dairy Co., Ltd., Sir George Schuster, K.C.S.I., K.C.M.G., C.B.E., M.C., said that the trading results of the Maypole Company and its subsidiaries at £291,819, against £341,002 for the previous year, showed a decline. It was proposed to allocate £28,250 to the reserve, and the final result after allowing for some increased appropriations by the subsidiaries was that the net profit available for distribution was £108,901, as against £103,112 last year. This sum included the dividends and other income from the Danish subsidiaries accruing for the years 1940 to 1944, which would have been available for distribution in prior years, and he felt justified in utilising it for the purpose of maintaining the Deferred dividend at 3 per cent.

Malt Substitute

A highly efficient substitute for malt as a means of growing yeast for fermentation purposes in brewing has been found in "mould bran," according to a paper read at a recent meeting of the American Chemical Society.

Stated to be similar to bread mould, the new organism is called *Aspergillus oryzae*, and is reputed to be two or three times more efficient than its predecessor. Experiments with mould bran cut the time required for souring the mash by half and at the same time resulted in twice the quantity of yeast.

Meanwhile, in the U.S., hop growers, who have increased their acreage by 10 per cent. this year, are facing a crisis. While brewers already have a surplus of hops on hand, the recent reduction in their grain allocations will result in a yet smaller demand for this product.—*Reuter's Trade Service.*

World Sugar Allocation

The Combined Food Board has allocated 1,825,000 tons of sugar to Britain, according to Washington reports.

The Board estimated that the total world supply of sugar for this year will be 11,809,000 short tons, compared with 12,270,000 last year. Europe and North America will receive 11,133,000 tons—4,042,000 from production in claimant countries and 7,091,000 from imports. The remainder of the world supply—676,000 tons—will be allocated to areas in India and the Pacific Oceans.

Apart from Britain, allocations include: United States, 5,711,000 tons; Canada, 465,000; France, 1,068,000; Austria, 81,000; Netherlands, 252,000; UNRRA countries (Yugoslavia, Greece, Albania, Italy), 331,000; Norway, 72,000; Belgium, 201,000; Switzerland, 97,000; Finland, 45,000.

Of the exportable supply allocated, Cuba is expected to furnish 3,900,000 tons, Puerto Rico and the Virgin Islands 944,000, Hawaii 840,000, Dominican Republic and Haiti 455,000, British West Indies 550,000, French Colonies 172,000, and other minor sources 232,000. An additional 347,000 tons has been allocated jointly to Britain and Canada for the two countries' military export needs.—*Reuter.*

Whale Factory's Harvest

The Norwegian whaling factory ship, *Sir James Clark Ross*, has returned from winter whaling in the Antarctic with 64,000 barrels of whale oil and 1,000 tons of dried whale meat flour on board. —*Reuter's Trade Service.*

Dehydration Plants to Close

Vegetable dehydration plants in the Union of South Africa will shortly close down with the exception of one or two whose activities will be on a much restricted scale.

Large Government orders have now ceased, and a suggestion by the industry that a stock should be built up of one or two thousand tons of dehydrated food has not met with Government approval.

Easier-to-Use Oven

A newly designed oven was featured at the World's Invention Exposition held in Chicago. The oven is contained in a normal-type stove of either the gas or electric variety and is designed to eliminate the necessity of reaching inside it to examine food during cooking. Cylindrically shaped, its curved door slides into the wall of the oven on rollers revealing two circular wire-grilling trays. These may be rotated to bring the contents of the oven to the front, thus avoiding the necessity of exposing the arms to the heat therein. A special broiling oven at the side has a grill and juice pan which are brought to the front on a lever system when the door is opened.—*Reuter's Trade Service.*

Soviet Food News

Food is becoming more plentiful and more varied in the Soviet Union. Out of the 5,500 food factories wrecked by the Germans some 3,000 are already in production. Under the new Five-Year Plan provision has been made for the erection of many new food factories, each of which is to be equipped with the most up-to-date machinery.

In Lithuania two sugar mills, 150 confectionery factories, and mechanised bakeries are to be built. Five meat-packing plants, wrecked by the Germans, are working again, and vegetable oil production is to be increased by 50 per cent.

The Georgian Tea Research Institute have developed two varieties of tea with a yield double that of China tea. Tea cultivation experiments are also being conducted in Central Asia. Scientists have recently evolved methods of growing tea in the hot districts of this area. A special variety of maize is being cultivated which is sown between rows of tea bushes. The maize protects the tea from the hot sun and absorbs the alkali of the soil, which is harmful for the tea.

Ten new sugar and treacle mills are planned, each of which will be capable of processing 1,500 to 1,750 tons of sugar beet per day.

The canning industry is also included in development plans and nine new canneries are to be erected before 1950, one of which will have an annual capacity of 100 million tins.

Developing Nigeria's Fisheries

A scheme is being worked out for the development of creek and river fisheries in Nigeria. An outstanding feature of this scheme—which may cost £95,600—is the possibility that properly organised fish farming may produce additional supplies of food for the southern provinces of the country.

Sea fishing in Nigeria is also to be the subject of special research, and to finance this money has been allocated from Colonial Development and Welfare Funds.

Food Manufacture Prospects in Trinidad

The president of a United States company of manufacturers of dehydrated foods has recently visited Trinidad and expressed the opinion that that Colony lends itself to the growing and development of large crops of various kinds of fruits, and that it has an undeveloped potentiality for food manufacture.

This American business man has been investigating the possibility of setting up plants for manufacturing his company's products both in Trinidad and Jamaica.

Ministry Announcements

Rye (Control of Mills and Products) Order 1942

An Order amending the Rye (Control of Mills and Products) Order, 1942, came into force on May 8, and prohibits the acquisition of rye products in excess of the quantities reasonably required for household consumption or for use in establishments.

Fruit from Eire

The Ministry of Food, in agreement with the Board of Trade, announces that the import of fresh blackberries and bilberries from Eire will be allowed under individual import licence.

Applications for import licences should be submitted to the Import Licensing Department, Board of Trade, 189, Regent Street, W.1.

Scientific Advisers

Sir Jack Drummond, F.R.S., Scientific Adviser to the Ministry of Food, and Dr. T. Moran, C.B.E., Director of Research and Deputy Scientific Adviser, have resigned their appointments with effect from May 31, 1946.

In the meantime Dr. M. Pyke will take charge of nutritional matters, and Dr. H. R. Barnell will deal with technological problems regarding particular commodities.

British Food Mission

It has been decided to set up in Buenos Aires a small Food Mission to represent the Ministry of Food in London. The head of this Mission will be Mr. A. J. Cooke, who will himself be responsible for questions concerning cereals, and who will be assisted by experts on other foodstuffs.

The purpose of this Food Mission will be to keep the Ministry of Food fully informed of all developments affecting export of foodstuffs from Argentina and to maintain close contact with the Argentine authorities.

It will also be the duty of the Food Mission, under general guidance of His Britannic Majesty's Ambassador, to co-ordinate British policy in all matters concerning the procurement of foodstuffs from Argentina.

The new Minister of Food, Mr. John Strachey.

Elliott and Fry.

Ready-to-Eat Table Jellies

Traders are reminded that "gelatine products" are controlled by S.R. & O. 1942 No. 2476 under the Manufactured and Prepacked Foods Order. This means that the manufacture of ready-to-eat table jellies, coloured and flavoured gelatine, and unsweetened types of table jellies and table creams made with gelatine is prohibited except under licence.

At present licences are not being granted for these products, so that they may only be made by caterers for consumption on their premises.

Traders are also reminded that table jelly compounds, crystals, and tablets, as defined by the Table Jellies (Maximum Prices) Order, 1946 (S.R. & O. 1946 No. 384), may be manufactured only under licence.

In addition to the manufacturer, retailers of all types of table jellies, table jelly compounds, crystals, and tablets, coloured and flavoured gelatine, and table creams made with gelatine, which are manufactured without a licence, are liable to prosecution.

Appointments and Resignations

The Minister of Agriculture and Fisheries has appointed Lord Walkden, J.P., to be chairman of the Allotments and Gardens Council and the Country Garden Produce Central Committee in place of the Right Hon. Lord Bingley, J.P., D.L., who has resigned.

These bodies were set up to advise the Minister of Agriculture, during the period of emergency, on matters arising out of the campaign for the increased production of food from allotments and gardens.

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Sir Harry Peat, K.B.E., who has been the Financial Secretary to the Ministry of Food since the beginning of the war, left the Ministry at the end of June and returned to his private practice. Sir Harry Peat and several of his partners have given their services without remuneration throughout the war and have rendered a great service to the Ministry and the country.

The Minister has, with the approval of the Prime Minister, appointed Mr. E. E. Bailey, D.Phil. (Oxon), LL.M., to be Under Secretary (Finance) in succession to Sir Harry Peat. Mr. Bailey, who was formerly Director-General of the Middle East Supply Centre, has already taken up his duties in the Ministry.

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Sir Eyre Gordon, C.S.I., C.I.E., Divisional Food Officer for the Midland Division, found it necessary for health reasons to resign his appointment with effect from May 15, 1946.

The Minister wishes to place on record his appreciation of the valuable services which Sir Eyre Gordon has rendered to the Ministry during the last four years.

Mr. E. A. Edwards, M.B.E., Deputy Divisional Food Officer in the Midland Division, has been promoted to fill the vacancy with effect from May 16, 1946.

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Mr. Frederick J. Monkhouse, Director of Miscellaneous Food Products Branch, relinquished his appointment on April 30, 1946.

British Mission to America

Following a recommendation made by the Agricultural Machinery Development Board, the Ministry of Agriculture, after consultation with the Ministry of Food, has made arrangements for a small mission to visit North America, consisting of Mr. H. S. Hall, Head of the Dairy Engineering Section, and Mr. A. Rowlands, Bacteriologist, both of the National Institute for Research in Dairying.

The main objects of the Mission will be to examine the mechanisation of milk production and handling, with particular reference to cowshed practice, machine milking, the design of milk equipment, methods of cooling and sterilising, and the effects on the bacteriological quality of milk; and to study the current research work being undertaken.

Relaxations of Export Controls

Further relaxations of export control are made by a new Board of Trade Order (S.R. & O. 1946 No. 667, price 1d.), which came into operation on May 23, 1946.

Among the goods affected by this Order are:

Group 1.—The item "Yeast, whether dead or live, extracts from yeast and edible preparations made from yeast" has been deleted and the following substituted, "Yeast, whether dead or live."

Article 4 (k) added by this Order authorises the export without licence of:

"Any tea, if permission for the said tea to be exported has been given by or on behalf of the Minister of Food and if evidence of such permission is duly produced to the satisfaction of the proper Officer of Customs and Excise at the port of shipment."

The Order frees from export licensing control "Baking powder and mustard, other than mustard seed."

Exporters will, of course, appreciate that the above notice refers only to export licensing requirements and does not in any way affect any other regulations which may be in force governing the manufacture, acquisition, disposal, etc., of goods, including manufacture, acquisition, disposal, etc., for export.

1946 Imports of French Wines

Negotiations have now been concluded for the importation of considerable quantities of wines and spirits from France during the remainder of 1946. Wines and spirits constitute one of the main imports into this country from France, and it is hoped that the proposed expenditure during 1946 of nearly £4,000,000 on these commodities will materially assist in the revival of trade between the two countries.

As on the previous occasion the wines will be imported by trade and distributed as equitably as possible through the normal trade channels. The Wines and Spirits Association is preparing allocation lists for the guidance of the Ministry, and trade enquiries should be addressed to the Association at Vintry House, Upper Thames Street, London, E.C.

Further Measures to Save Wheat

In view of the grave shortage of wheat facing India, South Africa, certain Colonial territories, and the UNRRA countries, the first steps to save wheat and flour have already been announced. These were the reduction in the standard 1 lb. loaf to 14 oz., in the 2 lb. loaf to 1¾ lb., and in the 4 lb. loaf to 3½ lb., and a reduction in the brewing of beer to 90 per cent. of the pre-war production in terms of standard barrelage.

The following further steps have now been decided upon:

(1) The extraction rate of flour, which was on March 10 increased to 85 per cent. compared with an average rate of 73 per cent. before the war, will now be raised as a temporary measure to 90 per cent. The change in the rate of extraction involves some consequential changes in the supply of feeding stuffs this summer.

(2) The output of biscuits and similar products will be reduced by 25 per cent.

(3) The allocations of sugar and fats for flour confectionery and cakes will be reduced by 25 per cent., with a view to securing a reduction in the consumption of flour for cakes.

It is hoped that these drastic steps will enable the most stringent period between now and the gathering of the next harvest to be bridged.

Bread Grists

The maximum proportion of home-grown wheat which millers in all areas are permitted to use in grists for bread-making flours was increased to 20 per cent. from May 26, except that in the case of mills of less than ten sacks per hour capacity, situated in rural areas and drawing their supplies from local sources, the maximum permitted proportion of home-grown wheat in bread-making grists is fixed at 30 per cent.

Bread Subsidies

Officials of the Ministry of Food have discussed with representatives of the baking industry of England, Wales, Scotland, and Northern Ireland the adjustment necessary in the bread subsidy as a result of the reduction in the standard weights of loaves.

The adjustments are as follows:

England and Wales.—The rate of bread subsidy was reduced from 9s. per sack of flour to 5s. 9d. per sack from May 5, 1946. In arriving at this new rate of subsidy, provisional allowance has been made for the higher wages payable to bakery trade operatives from April 29, 1946.

Scotland.—There will be a retrospective adjustment to increase the rate of subsidy from 9s. 3d. per sack of flour to 10s. per sack from October 15, 1945. The rate of subsidy would be reduced from 10s. per sack to 6s. per sack from May 5, 1946.

Northern Ireland.—There will be a retrospective adjustment to increase the rate of subsidy from 5s. per sack of flour to 7s. 6d. per sack from December 30, 1945. The rate of subsidy would be reduced from 7s. 6d. per sack to 3s. per sack from May 5, 1946.

In view of a number of uncertain factors in regard to the effect of the reduction in the weight of the loaf upon the costs of production of bread, it was agreed between the representatives of the Ministry and the trade that the new rate of subsidy should be a provisional payment only, subject to retrospective adjustment in the light of the results revealed by the next costings survey.

Meat for Manufacturers

From June 16, 1946, there was a small increase in the allocations of meat to manufacturers.

The increases in the manufacturing allowances of the various groups of manufacturers are as follows:

Group 1 from 35 to 50 per cent. of datum usage.
Group 2 (general butchers) from 5 to 7 per cent. of their ration meat authorisations.
Group 3 from 30 to 40 per cent. of datum usage.
Group 4 (pork butchers) from 40 to 60 per cent. of their datum figure.

Bakers' Yeast

The voluntary schemes of zoning and price control of bakers' yeast, which operated during the war by agreement with the trade, ended on June 1, 1946.

Formerly, yeast manufacturers paid a price considerably below cost for the molasses they used in the manufacture of yeast, but from June 1 they were charged the full cost price. This may result in a slight increase in the prices of the lower grades of yeast, but the manufacturers have undertaken to disclose any proposed price increases to the Ministry, which will satisfy itself that no unwarranted rise in prices takes place.

Relaxation of Price Control

EXPORT SALES OF FOODSTUFFS

An Order has been made abolishing price controls on export sales of foodstuffs and other goods (such as soap and animal feeding stuffs) subject to price control under Orders of the Minister. At present the prices permitted on export sales are in general the same as those applying to domestic sales, and exporters have not been permitted to charge for additional expenses of packing for export, freight, etc., without obtaining special authority, or to benefit by any higher prices ruling in overseas markets. With certain exceptions these restrictions have been removed. Sales prior to the actual export sale and sales for ships' stores to be taken on board in a United Kingdom port are unaffected by the Order, and will remain subject to price control in all cases where such control exists already.

The Order defines export sales so as to include sales to agents or branch offices who take delivery in the United Kingdom of goods intended for shipment to a principal overseas. Persons buying in this capacity are required to disclose the fact to the seller, so that he may know that the transaction is free of price control.

Export sales of certain scheduled commodities and also sales to the Channel Islands and the Isle of Man will remain subject to price control. In these classes of sales, however, the exporter will be permitted in future to charge reasonable transport costs incurred by him over and above costs of delivery f.o.b. at a United Kingdom port; the maximum, minimum, and fixed prices applicable to any such export sale will include costs of delivery f.o.b. in cases where on a domestic sale delivery to buyer's premises would be included. The exporter will be required to reduce the maximum, minimum, or fixed price chargeable on an export sale by the amount of any drawback which he may collect.

The Order does not remove any controls over the kinds or quantities of goods that may be exported, and it should not be assumed that it is intended to relax any such controls in respect of particular goods in the near future merely because the export prices have been decontrolled.

The Order is issued under the Supplies and Services (Transitional Powers) Act, and is entitled The Exports (Relaxation of Price Control) Order, 1946. Copies of the Order are obtainable from H.M. Stationery Office or from any bookseller.

"How do they manage on it?" asked Paulette Goddard, American film star, who recently visited the Ministry of Food.

"It might be worse," says young Alastair Maiden.

Information and Advice

Conversion of Wheat Starch to Maltose

B.743. *Information required relevant to the conversion of wheat starch to maltose and suppliers of the necessary machinery.* (Yorks.)

Most of the machinery for this work is built up by the manufacturers themselves. The suspension is made by stirring the flour slowly into water in a vat and then leading or pumping the slurry to an imperforate type of centrifuge. By the use of acid—*e.g.* acetic or hydrochloric—in the paddling process, the dispersion of the gluten is rendered more complete, and if the starch, after separation, is stored for some time in the wet state, some solubilisation takes place which renders the pastes more easy to handle during the enzymic conversion.

The starch does not need a purification process unless pure crystalline maltose is desired, when a very pure starch should be used in order that the impurities shall not affect the crystallisation. The presence of gluten in the product should not affect its possible usages for sweetening in the baking trades, although it may tend to detract somewhat from its appearance.

Names and addresses of suppliers of the necessary machinery were given.

Incorporation of Vitamins

B.1036. *Please let us know the best method of adding* (a) *vitamin A in oil solution;* (b) *vitamin D crystallised or in oil solution to a powdery stuff (not granulated) composed of alimentary phosphate, chalk, magnesia sulphate, iron carbonate, charcoal, copper sulphate, zinc sulphate, and cobalt sulphate. This mixture would be destined for cattle feeding. Please consider the problem under the point of view of:* (1) *Oxidation of the vitamins.* (2) *Adsorption by the charcoal.* (3) *Utilisation by other oxidants.* (4) *Other means of conservation.* (Belgium.)

It is doubtful whether an entirely satisfactory method of incorporating vitamin A in a solid preparation has been devised, although dried milk can be fortified with vitamin D by adding a suitable emulsion to the milk before drying, and the product appears to be quite stable.

Vitamin A is very readily oxidised, however, with loss of activity. The rate of oxidation can be appreciably reduced by the addition of hydroquinone, tocopherol, or similar antioxidant, but these only postpone the eventual destruction, and antioxidants do not provide the final answer to the problem of stabilising vitamin A solutions.

The oxidation of vitamin A is speeded up considerably when attempts are made to incorporate it in a powder, since its dispersal over a large surface area greatly facilitates atmospheric oxidation. Vitamin D, normally more stable than vitamin A, is also oxidised under these conditions. The presence in the powder of small amounts of metals, especially copper, would enhance the effect still further, as these catalyse the oxidation of both vitamins.

Apparently the only hopeful method of preventing this destruction is to prepare a solid solution or emulsion of the vitamin, and coat each particle with a protective envelope of some material impervious to air, although capable of being attacked by the digestive enzymes so that the vitamins are liberated after ingestion. This is the principle of the methods disclosed in Brit. Pats. 490001 and 491212, in which an emulsion of a vitamin-containing oil in aqueous gelatine is dispersed in an immiscible liquid so that the latter forms the continuous phase of a polyphase emulsion, which is then cooled to cause the colloid to gel; the immiscible liquid and part of the water are then removed. The product consists of small particles of gelatine enclosing droplets of vitamin solution, and is said to retain its biological activity for a substantial length of time, although no details have been published.

Unless some such method of protecting the vitamin is adopted, it is fairly certain that a mixture of vitamin A or vitamin D with a powder of the type described will lose its activity in the course of a few days, because of the very rapid destruction by atmospheric oxygen; adsorption by charcoal would play a very minor role.

If possible, some other method of administering the vitamins, not involving admixture with a powder, should be adopted.

Information Supplied

B.917. *Recipe for an inexpensive good quality lemon cheese and procedure.* (Warwicks.)

B.921. *Recipe for war-time ice cream.* (Norway.)

B.922. *Particulars of the makers of machinery for the manufacture of pre-packed ice cream.* (Herts.)

B.929. *Information on the manufacture of dry mustard.* (Australia.)

B.934. *Names and addresses of suppliers of invert sugar.* (Lancs.)

B.937. *The drying of carrageen moss and its reduction to powder form.* (Devon.)

B.942. *Solvents used in the manufacture of essences for the bakery trade.* (London.)

B.943. *The possibility of manufacturing fondant with material other than glucose.* (Bristol.)

B.945. *Names and addresses of manufacturers of pickles and sauces.* (Norway.)

B.953. *Manufacturers of plant for the production of egg powder, and printers of labels for fruit tins, jam jars, etc.* (India.)

B.954. *Names and addresses of firms manufacturing machinery and equipment for the making of lard compound.* (Birkenhead.)

B.960. *Manufacturers of the rotary louvre drier illustrated in the March issue of* FOOD MANUFACTURE. (Cheshire.)

B.964. *Names and addresses of manufacturers of onion peeling machinery.* (Northumberland.)

B.965. *Makers of triturating equipment.* (Manchester.)

B.970. *Names of manufacturers of electric mixers for crab meat mixing.* (Warwicks.)

Recent Patents

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Specifications Published

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

575,954. KENWORTHY, J. S. K.: Methods and apparatus for packaging foodstuffs.
576,005. WARRINGTON, J. I. D., and BAKER PERKINS, LTD.: Band or conveyor ovens and the like.
576,051. SIMON, LTD., H., and LOCKWOOD, J. F.: Purifying machines for cereal products.
576,054. CRAWFORD AND SONS, LTD., W., and JENSEN, H. R.: Manufacture of foods, especially baked cereal products and compositions for incorporation therein.
576,055. BRITISH ARKADY CO., LTD., FORD, W. P., and MAIDEN, A. M.: Manufacture of bread and like products.
576,069. TUNLEY, A. A., and BAKER PERKINS, LTD.: Strickling means for chocolate or other mould or tray conveying plant.
576,282. LEGG, O.: Cutting, severing, slicing, and like machines.
576,286. CARR AND CO., LTD., and TAYLOR, J.: Means for spacing dough pieces on conveyors.
576,374. CRUICKSHANK, LTD., R., and BURSTON, J. R.: Machines for mixing powders and liquids.
576,578. PLATERS AND STAMPERS, LTD., and CRANDELL, P. A.: Can openers.
576,741. DEHN, F. B. (MILLS INDUSTRIES, INC.): Refrigerating systems particularly for the freezing of ice cream and like products.

Abstracts of Recent Specifications

Improvements in or Relating to Canned Foods and Beverages Incorporating Exothermic Heating Devices

The present invention relates to canned foods and beverages and more particularly to the provision of a closed can containing a comestible through which heat can be transferred by convection and intended to be consumed hot, having the necessary heat generating means integral with the can and immersed in the comestible, the heating material employed being such as to give rise to no inflammable vapours on storage.

According to the invention a unitary container comprises a hermetically sealed compartment charged with a comestible through which heat can be conducted by convection, a second compartment within the first compartment but closed off therefrom, and closed off from the exterior of the container by means of the wall of the first compartment or by a closure member secured thereto, a composition enclosed within the second compartment and comprising ingredients capable on ignition of undergoing chemical reaction with the generation of heat but substantially without the evolution of inflammable gas or vapour, a vent leading from the second compartment to the exterior of the container, a heat-resisting filter located between the heating charge and the vent, and means operable from the exterior of the container for igniting the heating charge.

The heating charge container may conveniently take the form of a metal tube, closed at one end, of suitable metal and preferably the same material as the material of the can. This may be made from sheet metal by any method yielding a gas-tight closure, for instance, by drawing or folding, seaming, and soldering desirably with tin.

The heating mixture may comprise a pulverulent metal, alloy, or silicate and a pulverulent oxidising agent that react together when thermally initiated to yield intense heat but little or no gas. Suitable mixtures may be formed, for instance, from calcium silicide and red lead and/or iron oxide, aluminium and iron oxide, ferro-silicon and red lead, or antimony and potassium permanganate. Other combinations of oxidising and reducing agents on which the heating mixture may be based include those mentioned in British Specifications Nos. 462,000, 383,650, 389,309, 514,741, and 430,750. The intensity of the reaction may be controlled by varying the proportion of reducing agent to oxidising agent, or by the inclusion of such ingredients as talc or china clay, but the mixture should be such as to assume a red to white heat when ignited in an uncooled vessel. The mixture may be compressed or caked to minimise its bulk.

572,573. *Walter Anderson Caldwell and Imperial Chemical Industries, Ltd.*

Trade Marks

The list of trade marks of interest to readers has been selected from the "Official Trade Marks Journal" and is published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

PRE-GESTEE.—636,575. Tea, coffee, and coffee essence. **Brooke Bond and Co., Ltd.,** Calcutta House, Goulston Street, Aldgate, London, E.1.; Tea and Coffee Dealers.
ANNIVERSARY.—636,645. Chocolate and sugar confectionery (not medicated). **Chantry Trading Supplies, Ltd.,** Penton Hook, Staines, Middlesex; Merchants.
TRANQUILLITY.—636,646. Chocolate and sugar confectionery (not medicated). **Chantry Trading Supplies, Ltd.,** Penton Hook, Staines, Middlesex; Merchants.
HUM.—636,695. Confectionery (not medicated). **J. Lyons and Co., Ltd.,** Cadby Hall, Hammersmith Road, Kensington, London, W.14; Caterers and Purveyors.

New Companies

Alimentary Paste (Great Britain), Limited. (401404.) 14, Waterloo place, S.W.1. Nom. Cap.: £3,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: Mrs. A. Ward, 74, Tanfield Road, Croydon; A. Y. Johnston, 80, Selbourne Road, N.14 (acct.).

West Riding Dairy Farmers (Wholesale), Limited. (401993.) Wood Lane, Sowerby New Road, Sowerby, Yorks. To take over a wholesale dairy business carried on at Sowerby Bridge by A. Crossfield. Nom. cap.: £5,000 in £1 shares. Dirs.: A. Crossfield and Irene A. Crossfield, both of Daisy Lea Farm, Sowerby Bridge, Yorks.

Grayson Containers, Limited. (402091.) Anne Street, E.13. To carry on bus. of manufacturers of and dealers in boxes, containers, etc. Nom. cap.: £8,000 in 4,000 ord. shares and 4,000 pref. shares of £1 each. Dirs.: A. C. S. Gray and A. S. Gray, both of 12, Nevin Drive, E.4; R. J. Tomkins, 8, Wensleydale Avenue, Ilford.

W. W. Wilkinson and Co., Limited. (402154.) To carry on bus. of manufacturers of and dealers in English and foreign canned foods, electric goods, etc. Nom. cap.: £1,500 in £1 shares. Dirs.: W. W. Wilkinson, Harcourt Mansions, 23, Craven Hill Gardens, Lancaster Gate, W.2; L. W. Bird, Audrey House, Ely Place, E.C.1.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C. 2.